IN-99
125952

NASA SP-4310

P.508

Way Station to Space

A History of the John C. Stennis Space Center

by

Mack R. Herring

The NASA History Series

National Aeronautics and Space Administration
NASA History Office
Office of Policy and Plans
Washington, DC 1997

Library of Congress Cataloguing-in-Publication Data

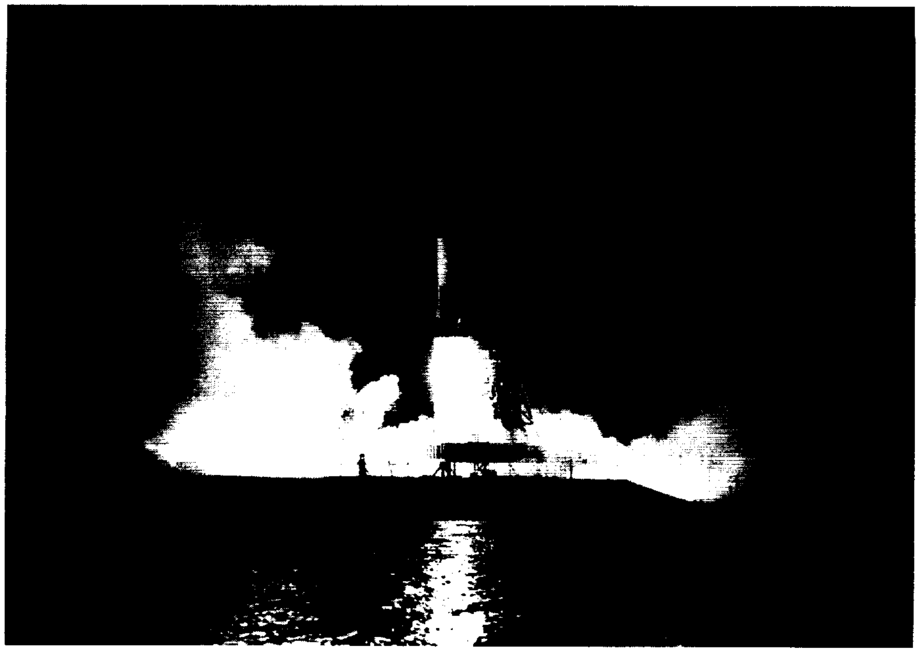
Herring, Mack R., 1935–
Way Station to Space: A History of the John C. Stennis Space Center by Mack R. Herring.
p. cm.—(The NASA History Series) (NASA SP: 4310)
Includes bibliographical references and index.
1. John C. Stennis Space Center—History I. Title. II. Series. III. Series: NASA SP: 4310
TL682.J65H47 1997
629.4'0720762'14—dc21

97-27290
CIP

For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-049252-1

To Robert E. Herring (1927–1993), my brother, mentor and friend;
to my family, who never stopped believing;
and to my friends and co-workers at the
NASA John C. Stennis Space Center,
who I had the honor of sharing a common dream
and the history of our part
of America's adventure in space.

Contents



"The mastery of space is man's greatest adventure and his most inspiring undertaking. It should spur us to maximum effort. The nation which mastered all man's earthly environment—land, sea, and air—owes to its destiny the mastery of the limitless environment of space."

Wernher von Braun
1960

List of Illustrations

Foreword

Way Station to Space* is a history of the NASA John C. Stennis Space Center, one of NASA's 10 Field Centers which was built in the enormously exciting days of the Apollo program for a specific purpose—to static fire and certify the huge Saturn V boosters used in the Apollo lunar landing program. With an eye to the future, the facility was planned as a national testing site for large propulsion systems that NASA might use for 25 to 50 years.

This book provides the reader with a study of the Apollo era when NASA engineers, technicians, and managers were engaged in that fantastic mission. It captures a sense of the excitement and determination of the NASA team as it prepared for those historic journeys to our nearest planetary neighbor. This book, however, also illustrates the evolution of the south Mississippi facility beyond the Apollo era.

The development of the traditions and pride of the NASA Government and contractor teams, formulated during those early years, is likewise portrayed. As is indicated in the text, few of the men and women of that time are still actively working with us, but their tradition of excellence and hard work lives on.

As the Apollo program began to ebb, the Nation's focus shifted away from the most ambitious plans for space exploration—to colonize the Moon, construct a Space Station, and mount a human mission to Mars—to less costly endeavors. Under creative management, the Mississippi team began to study the Nation's new priorities with the intention of becoming an integral part of the changing times. The Mississippi Test Facility (MTF—former name of SSC) diversified and brought in other Federal and State agencies to help share the cost of the Center and use of the developing technology. MTF personnel began looking for other customers, private and commercial, in addition to their new Government tenants. The men and women of the MTF were, in a real sense, "reinventing" Government over 25 years ago, long before that concept came into vogue.

Way Station to Space takes the reader back through those interesting times and relates the story of how the small team evolved into a paradigm of

engineering and scientific cooperation for others to follow. The MTF team recycled facilities and resources, turning part of the huge Center into a diverse environmental research center. The Stennis Space Center now serves as a model of multiagency synergy and is home to over 30 Federal and State agencies, universities, and private industries.

This new addition to the NASA history series also illustrates how the men and women of this south Mississippi facility met challenges head-on. They not only preserved their installation, but they built a new foundation for the future. As a result in 1996, the Stennis Space Center was officially designated as NASA's Lead Center for rocket propulsion testing and in 1997 as the Lead Center for Commercial Remote Sensing.

Way Station to Space is not only the history of one of NASA's Centers, it is also an allegory of the Center's relationship to the local communities in Mississippi and Louisiana, its sister Centers, and to NASA Headquarters.

It was written by an award-winning author, Mack R. Herring, a 33-year veteran of NASA. Mr. Herring spent most of his career as a public affairs officer, historian, and writer for NASA at the Stennis Space Center. He has spent the last 6 years gathering information and writing this history. His corporate memory is noted, but the reader will find this history well documented with interviews, letters, and a variety of other sources.

Not only does this book tell an interesting story about the Stennis Space Center and NASA's first decades of space exploration, it also offers a guide to the changing times ahead as we approach the new millennium. Perhaps just as importantly, *Way Station to Space* captures the true spirit of NASA that abides with us today as we meet the challenges of tomorrow.

Daniel S. Goldin
NASA Administrator

Acknowledgments

This history, like most other projects I have worked on during my NASA years, was a true team effort. I have never been able to refer to this manuscript as "my book" as most other authors proclaim. *Way Station to Space* is our book! There were literally hundreds of people who contributed to these pages. Like myself, most lived the story.

Of those people, I now acknowledge some whom I had the opportunity of working with on a day-to-day basis, or who gave large chunks of their time to this book. I must tell the readers how much Virginia A. Butler, a University of Southern Mississippi (USM) graduate student, had to do with researching, editing, and, more importantly, helping me with the tricky turns one encounters when putting a book together. Sometimes this process involved long and tedious discussions with the author, who hated to see his chopped-up prose hit the cutting room floor. I believe Virginia understood the team concept better than most anyone involved. In fact, she came to fiercely defend our work and exercised her ownership at every turn. Toward the end, you could hardly tell who the author was. She took her editorship very seriously. Virginia's stubbornness and refusal to give in to me when she felt she was right added a fourth dimension to "our" book.

Very special thanks go to Myron Webb, NASA Stennis Space Center's (SSC) public affairs officer, friend, and long-time colleague. Myron was one of our first-line readers. She also deserves recognition for cheering me on during the lonely hours of research and writing when the "poor me's" would sink in. Her words of encouragement provided an antidote for the harsh, but sometimes necessary, derision from the scholarly critics. In addition to moral support, Myron's help in suggesting and arranging interviews was critical in order for us to obtain the appropriate information and meet publishing deadlines. She often accompanied me on the interviews and asked just the right questions to keep the sessions moving in a productive manner.

I also want to thank Lanee Cobb, SSC's news chief and in-house grammarian. Lanee's expertise added confidence with our knowledge that her

friendly, but objective, safety net would catch any inappropriate usage or misusage in the occasionally rambling text. She certainly upheld her reputation during the course of writing this book.

Although we sometimes had fierce disagreements regarding style, Dr. Charles "Chuck" Bolton, of the University of Southern Mississippi's History Department, rendered a great deal of help in providing me with insight into the elements of historical prose. I studied journalism and creative writing at the University of Alabama and spent my entire professional career writing in some manner for newpapers, magazines, and for NASA. I must admit, however, that this book offered a special challenge. Chuck helped me bridge that gap in my literary career.

On behalf of the "SSC history team," it is an honor to express our appreciation to Dr. Roger D. Launius, NASA's Chief Historian, and his staff for their assistance in research and their efforts in helping keep this book historically correct. We especially want to thank Roger for his faith in our team and his support in adding our story to the prestigious NASA collection.

We extend our appreciation to Dr. John Ray Skates, noted military historian and retired USM professor, who served on our peer review team. Dr. Skates offered a number of helpful recommendations that we know increased the readability and acceptability of our book.

I want to thank Christine "Chris" Harvey, Stennis Space Center Information Services Specialist, for providing research and logistical support. In addition, her high-tech expertise in keeping my old computer on the road was greatly appreciated. Along this line, I want to thank the USM graduate students working in the Stennis History Office who assisted with our project by pulling specific titles from our newly developed database.

Toward the end of the project, we solicited the professional help of SSC's expert and veteran editor, Ruth Carlson. Although Ruth and I have been friends for years, she set aside that relationship and gave the book a thorough review to make sure we submitted a tight and readable product to the final editor in Washington, D.C. On behalf of our Stennis team, I also want to express our appreciation to Louise Alstork, NASA Headquarters, who put the final editing touches to our manuscript, giving all who participated in the project a special confidence that we had a good product.

We had a number of expert technical readers, including current and retired employees, who volunteered their time to read the manuscript to ensure its accuracy. Roy Estess, Stennis Space Center director, read the entire book and spent several hours during at least five interviews providing guidance and material. In fact, Roy labored through one interview when he was ill and barely audible as he answered our questions. Roy's extreme modesty, however, sometimes prevented us from giving "credit where credit was due."

Jerry Hlass, former director, and Arthur J. "Jack" Rogers, Jr., former director of SSC Center Operations, read most of the manuscript and provided numerous comments and recommendations. In addition, Jerry spent several sessions with me providing informative and interesting interviews that proved to be invaluable in developing the Stennis Space Center story. In addition, he carefully explained several technical issues so that I could digest them and translate them into the book.

E.W. "Van" King, a former assistant director of the SSC and personal friend of Jackson Balch, also gave hours of his precious time filling in the blank spots of Mr. Balch's tenure as director. Van also graciously read the "Balch" chapters for accuracy. Janet Balch was most helpful with personal notes associated with her late husband's life and work on the Mississippi Gulf Coast.

During the course of researching this text, we conducted scores of interviews with SSC people and others who were knowledgeable of the center's history. It would be unwieldy to mention each and everyone, but I will cite several who gave us great assistance with reading the manuscript and spent hours in interviews. They were Gordon Artley; Tom Baggette; Roy Baxter; Marv Carpenter; Aaron Cohen; Jim Coward; Mark Craig; Steve Dick; Ken Human; Lon Miller; Boyce Mix; Pat Mooney; Wayne Mooneyhan; Renay Nelson; Roscoe Nicholson; Wayne Roberts; Pat Scheuermann; George Schloegel; Leo Seal, Jr.; Gerald Smith; Bill Tate; and Jim Taylor. There were, however, many others who unselfishly shared their stories, thoughts, and materials with us.

In addition to these past and present employees and community leaders, I would be greatly remiss if I did not give proper credit to my family who

obviously made my participation in writing this book possible. As anyone who has ever been involved in the lonely business of writing knows, the support of one's family is absolutely essential in the success of any work. My brother, Robert Earl Herring, was one of my life-long role models, providing me with inspiration as a youngster to read good books, to express myself with the written word, and to strive to achieve something worthwhile. Robert was my brother, my mentor, my friend. After encouraging me to write this book, Robert was unfortunately killed in a traffic accident. I wish he were here to share this history that he did so much to inspire.

I could not leave these acknowledgments without also honoring my parents, the late Robert Lee and Lillie Ray Herring, for providing a home and family filled with the love and values necessary for the development of any worthwhile contribution to the world. I hope and pray that this book will be a useful and lasting legacy.

My brother Paul Jackson Herring and my sister Mildred Herring Maddox were also great influences in my life and especially during the time I was writing this book. They both called regularly and asked, "How's the book coming?" or even more to the point, "What chapter are you on now?" Needless to say, their persistent coaxing kept me at the computer many times when I would have rather been somewhere else playing hooky!

To those wonderful people who supported every endeavor I ever undertook, I am most grateful. Other family members who contributed time, talents, and inspiration were my two sons, Steven Lee and Kyle Jackson. Both of these young men are terrific and expressive writers who have earned their own recognitions. I hope someday to read their books. For now, I thank them for sticking with their "old dad" through this project. I must also thank Joan Herring, my first wife, who has continued to offer praise and encouragement when many others held their tongues.

Last, but surely not least, I must mention my wife, Faye, who gave her total and unswerving support during the writing process of this manuscript. Faye was at my side through the 21 months I spent writing this book. She has been a close friend for 35 years and shared much of the Stennis Space Center history with me, adding a special inspiration.

Now, to all of you who fed me those juicy stories and humorous bits of our history that I wasn't able to include in this particular type of book, I say thank you. Keep up the good work and keep us in your memories. Maybe someday, the good Lord willing, we'll try it again!

26 February 1997

Mack R. Herring
Bay St. Louis, MS

Prologue

The history of America's adventure in space is one of the most fascinating stories ever told. It is a saga that I started following as a youngster in southeast Alabama some 50 years ago. To my family's consternation, I spent a goodly part of my formative years sitting on our front-porch swing during hot afternoons reading colorfully illustrated pulp fiction sci-fi rags such as *Amazing Stories*.

Later, when I was learning the ropes as a newspaper reporter, I watched the launch of Lieutenant Commander Alan Shepard, Jr., on his Mercury-Redstone suborbital spaceflight in 1961. No, I wasn't at Cape Canaveral. I would have missed that flight and maybe even the whole space "thing," had it not been for my four-year-old son, Steven, who excitedly called my attention to our black and white TV to watch that signature event. From that time on, I was hooked.

Like many science writers and reporters of that day, I had a gut feeling that the new NASA space odyssey was going to be the biggest story in my lifetime and I had to get close to it. Shortly after that historic day in 1961, a close friend of mine, Zack Strickland, told me that NASA needed a writer at the Marshall Space Flight Center (MSFC) in Huntsville, Alabama. Zack put in a good word for me at the Marshall Public Affairs Office and I was on my way. Another long-time friend, Jim Funkhouser, was already with NASA and escorted me all around the MSFC. Jim gave me a most informative and inspiring orientation that I carried in the back of my mind throughout my career with NASA.

At Huntsville, I had to pinch myself sometimes when I would wind up in the presence of Dr. Wernher von Braun, listening to astonishing plans for colonizing the Moon and flying out to Mars with an armada of electric-powered spaceships. Von Braun used to quip, "Electric propulsion is the best way to travel to Mars, but where are we going to find an extension cord that long!" Because of his unbelievable charisma, none of us doubted that he would someday come up with that magical connection. To say the least, I was awed by the whole experience, and to this day I sometimes find the entire space encounter as unbelievable as the

proverbial "man on the Moon." And to think that I would someday be asked to write a history of an important element of the NASA adventure would also have been considered by me back then as "pretty far out."

The idea for this book came from Roy Estess, director of the NASA Stennis Space Center (SSC), whose dedication is deeply rooted in the traditions of the installation. I believe that Roy is the only NASA center director who cared enough for history to obtain a minor in the subject while majoring in Aerospace Engineering at Mississippi State University.

It has been my most sincere wish that we sustain the SSC tradition of excellence with this book so that it will prove useful as it demonstrates that "what is past is prologue" to those who come after us at Stennis Space Center. Also, I am one of those cursed people, forced since birth to "save" everything that ever touched my fingers. During the 35 years I have been associated with NASA, I have packed away letters, memos, flight-plans, agendas, patches, pictures, notes, speeches, astronaut recovery maps, and literally hundreds of pounds of other assorted space-related documents. They had to be used somewhere!

These materials provided a beginning for our pursuit of acceptable archives at the SSC in 1990. Since its inception, Roy has supported the effort to establish an official historical records collection. In addition to Roy's desire to preserve the "rich history of the Stennis Center," there is a NASA directive charging all center directors to ensure the safe-keeping of historical documents and materials. By October 1994, when I finally answered the call to write this book, we had at least 5,000 documents in our computer database. I can conservatively say that about 80 percent of the primary and secondary evidence in this volume came from the SSC Historical Records Collection.

Our research did not rest, however, with locally accessed research material. Documents from the Library of Congress, National Defense Library, the history offices at NASA Headquarters, Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center were also examined. In addition, we personally interviewed more than 100 people who were knowledgeable of NASA programs and the Stennis Center. Also at our disposal was a 21-volume oral history collection developed by the University of Southern Mississippi that proved an excellent source to help document our

work. Lastly, Rex Cooksey and Johnny Mann filmed over 16 hours of interviews on videotape. One can imagine how useful those tapes were in helping research and write this history.

The reader should also be aware of another piece of information before proceeding to digest this book. I was fortunate enough to be one of the first full-time employees sent down from the Marshall Center in Huntsville to the old Mississippi Test Operations in February 1963. My corporate memory did perform an important function. I used that knowledge as a moving guide from the past to take me through the historical roads and seductive side-paths in my mind leading to the materials and people that could help keep the record straight. In fact there were many surprises for me as I attempted to untangle the quagmire of data often created in historical research. One thing about this book that the reader can count on: it is accurate to the very best of my ability and that of the many Stennis Space Center past and present employees who helped with the interviews and readings of the chapters.

What should the reader look for in the methodology and structure of this book? I tried to follow Lewis Carroll's advice from *Alice In Wonderland.* When Alice was trying to tell the Red Queen what has happened but found herself confused, the Queen advised, "Start at the beginning, go through to the end and then stop" What I have done here is start at "A beginning," go through to "An end" and then stop! Since *Way Station...* brings the reader right up to the present time, the last chapter and epilogue were more like reporting the news, real time, than writing history. Fun, but very difficult.

Dr. von Braun, in a 1966 letter to George Alexander of *Aviation Week,* stated: "The real purpose of MTF [Stennis Space Center] in its broadest context is to provide the United States with a capability during the next twenty to fifty years for captive test-firing large space vehicle systems." The famed rocket scientist said that the construction of the test facility was an "act of faith" that the nation wanted a preeminent spaceflight capability for "the indefinite future."

The relentless pursuit of the von Braun dream and the efforts of the small NASA "can do" team to fulfill the destiny of the Stennis Space Center to become NASA's "Center of Excellence" for rocket propulsion testing are illustrated. Indeed, the reader follows the Stennis Center under the leadership

of Jerry Hlass and Roy Estess, as they strive to elevate the center to a "higher level." With the support of Administrator Daniel Goldin, the SSC has finally been designated the Agency's lead center in that most critical phase of space vehicle test and development—propulsion testing.

Readers of this book will find that the Stennis Space Center and the activities examined are similar in some cases to those at other NASA centers. In many cases, however, the SSC experience has been vastly different from its sister field installations. For instance, the SSC was conceived and built from the ground up, during the early phases of the Apollo program in the early 1960s. Since the Stennis Space Center had virtually no roots before the Apollo era, save that of an offspring or component of the MSFC, the reader will find it interesting to follow the growth of the facility from its birth from Mother Marshall, through adolescence, and into rebellious teenage years as Stennis Space Center grew into full-blown adulthood. Sometimes, too, these growing pains and the quest for independence produced conflict within the NASA family.

A study of the Stennis Space Center will give the reader an understanding of the numerous types of engineers, technicians, and other personnel it took to make America's space program successful. Every discipline of engineering came together to build the Stennis Space Center and test the giant Saturn V boosters. In fact, many of these men and women have stayed at the facility and continue to test the Space Shuttle Main Engines, and the commercial, reusable, and expendable vehicles presently under development. In addition to the "smoke and fire" rocket test people, another breed of scientists and researchers came in during the 1970s to establish the multiagency complex, unique to the United States government. How this transition was carried off by Jackson Bach, then director of the SSC, and his small staff as they began to "reinvent" government is a different and interesting story.

Finally, as the reader moves from "A to Z," he or she will no doubt discover that the Stennis Space Center was blessed with what I refer to as "superb leadership." Senator John C. Stennis, who walks the pages of this history from beginning to end, was an ardent supporter of the facility. Captain Bill Fortune came to south Mississippi and rallied the troops and the community to get it all going. Jackson Balch added a new dimension with his

multiagency concept, and Jerry Hlass's persistent search for excellence lifted the center to a higher level. Finally, the stewardship of the SSC was handed over to Roy Estess, an engineer who came from the ranks to direct the SSC to become NASA's lead center of excellence for rocket propulsion testing, positioning the installation for its entry into the twenty-first century.

So, this book is about achievement, about leaders. But it is also more about the everyday people who really made the Stennis Space Center tick. These people, who are rarely mentioned in the printed pages of this book, are the real heroes of the SSC. It is my greatest regret that the hundreds and thousands of employees, government and contractor, are not each mentioned in this work. Von Braun often commented during the early years: "I don't know yet what method we will use to get to the Moon, but I do know that we have to go through Mississippi to get there!" *Way Station to Space* is about that part of America's space story that did happen at a "way station," along the route to space, called the John C. Stennis Space Center.

I fully realize that my long association with the SSC has been a rare opportunity for a historian. Most scholars have to rely on bits and pieces of letters and documents to complete their work. "Being there" is no doubt a great advantage and I am appreciative of that opportunity.

Let us now roll back the clock to a past time when America was about to set out on the world's greatest journey, and the pastoral communities along the Pearl River in Mississippi were about to be swept up into the epoch that changed forever the destiny of the human race.

CHAPTER 1

Decision for Mississippi

The Challenge

Before 25 October 1961, few people in America knew that the piney woods and cypress swamps along the Pearl River in Hancock County, Mississippi, would be transformed into a futuristic rocket-testing facility and become a vital part of America's Apollo lunar landing program. People living along this river received the news in disbelief when the announcement came over the radio, and again later as stark headlines in morning newspapers proclaimed, "Uncle Sam to Testfire Moon Rockets in State."[1]

The rocket-testing facility was a part of President John F. Kennedy's space exploration challenge to the American people. Just five months to the day before the announcement to build the test facility in Mississippi, President Kennedy (1917–1963) stood before a joint session of Congress and delivered what has been billed as his second State of the Union Address—this one entitled "Urgent National Needs"—exclaiming support for freedom around the world, and casting the Apollo program as a battle

1. "Uncle Sam To Testfire Moon Rockets In State," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*), 26 October 1961.

between "freedom and tyranny." The President ended the speech with, "I believe this nation should commit itself to achieving the goal, before the decade is out, of landing a man on the Moon and returning him safely to Earth." These words became the rallying battle cry for the National Aeronautics and Space Administration (NASA) and the promoters of a strong civil space program.[2]

The Apollo program, entrusted to NASA by Kennedy, was America's answer to early Soviet successes in space. Sputnik I, launched by the Soviets on 4 October 1957, struck at the heart of American pride, causing a rise in national ire and an apparent will to respond no matter what the cost.[3]

Mississippi Senator John C. Stennis (1901–1995)(D-Mississippi), aroused by Sputnik, was an early supporter of the American space program. Filled with national pride, and believing that his home state had the ability to answer the President's call, Stennis gave America's space program high priority. President Kennedy called on Stennis to encourage congressional passage of increases for space-related spending. Senator Stennis became an ardent advocate of the space program and a steadfast defender of the testing facility established in his home state. Recognition of his dedication came when President Ronald Reagan (1911–) honored him in 1988 by renaming the Mississippi facility the NASA John C. Stennis Space Center (SSC).[4]

A Distinguished Lineage

The roots of the SSC can be traced to the earliest days of modern rocketry in pre-World War II Germany, and in this country to the red-clay bottom land at the foot of Green Mountain along the Tennessee River in northern Alabama. The Apollo program fulfilled the dreams of famed rocket scientist Dr. Wernher

---

2. *Public Papers of the Presidents of the United States* (Washington, DC: Government Printing Office, 1962), pp. 403–405; Also see *Daily Journal of Wernher von Braun*, 1962 "Telephone Conversation Dr. von Braun/Dr. Holmes," 21 November 1962.
3. Roger D. Launius, *NASA: A History of the U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Co., 1994), pp. 24–26, 56.
4. Roger E. Bilstein, *Stages to Saturn: A Technological History of the Saturn Launch Vehicle* (Washington, DC: NASA SP-4206, 1980), pp. 70–74; "NASA Dedicates John C. Stennis Space Center," *Lagniappe*, 29 August 1988, located in the Stennis Space Center Historical Records Collection at Stennis Space Center, MS (henceforth referred to as SSCHRC).

von Braun (1912–1977) and other space enthusiasts who long envisioned peaceful exploration of space as the greatest adventure ever to be attempted.[5]

Von Braun and his team of German and American rocket scientists, engineers, and technicians assembled in 1950 at the U.S. Army's Redstone Arsenal near Huntsville, Alabama, to fashion the rocket boosters that would launch humanity's greatest technological adventure—a voyage to the Moon. A critical part in preparing the rockets for spaceflight was the static, or ground, testing of the rockets before they were committed for launch. Von Braun and his German colleagues learned from their very earliest experiments in Germany that much time, energy, and cost could be saved by thoroughly testing the rocket booster hardware before sending it skyward.[6]

It was this philosophy of rocket testing that dictated the absolute need for the rocket-testing facilities in Mississippi, which would become a national proving ground for the first and second stages of the giant Saturn V Moon rockets. The managers of the rocket-testing program in Alabama and in Mississippi were members of the "original von Braun team" of German rocket technicians who pioneered modern rocketry during the 1930s at Hitler's facility at Peenemunde on the Baltic Sea.[7]

Von Braun, born in Wirsitz, Germany, on 23 March 1912, conducted his first practical rocket experiment when he was a youngster living in Berlin. By age 13, von Braun developed a genuine interest in rockets and space travel. In 1932, he earned a bachelor's degree in mechanical engineering at the Berlin Institute of Technology, and at age 20 entered the University of Berlin. In 1937, von Braun became technical director of the Peenemunde Rocket Center.[8]

At Peenemunde, von Braun's organization concentrated on developing the A-4 long-range ballistic missile, which later saw operational use under the better known designation "V-2." In the closing days of World War II in 1945,

---

5. Erik Bergaust, *Wernher von Braun* (Binghampton, NY: Vail-Ballou, 1976), pp. 48, 146, 200; For additional information see Ruth G. Saurma, *Dr. Wernher von Braun Biographical Data and the German Rocket Team: A Chronology 1927–1980* (Huntsville, AL: MSFC Historical Records Collection, 1990). For information regarding transfer of the Development Operations Division of the ABMA to NASA, see "U.S. Congress and Senate Committee on Aeronautical and Space Science," 86th Congress, 2nd Session, *Transfer of von Braun Team To NASA* (Washington, DC: U.S. Government Printing Office, 1960).
6. *Ibid.*
7. Bergaust, *Wernher von Braun*, pp. 62, 204; For biographical information of von Braun, see John Martin Scott, *Countdown to Encounter: von Braun and the Astronauts* (Huntington, IN: Our Sunday Visitor, 1979); Willy Ley, *Rockets, Missiles, and Men in Space* (New York: Viking Press, 1968).
8. *Ibid.*; Paul O'Neil, "The Splendid Anachronism of Huntsville," *Fortune*, June 1962.

von Braun, with over 100 of his colleagues, fled the rocket center to avoid being captured by the Russians. The fleeing rocket scientists decided to surrender to the Americans in hopes of resuming their research in a safer, more temperate environment. Joseph Stalin, Premier of the United Soviet Socialist Republics, on learning that von Braun had surrendered to the Americans, allegedly said, "This is intolerable. We defeated the Nazi armies and occupied Berlin and Peenemunde, but the Americans got the rocket engineers."[9]

After World War II, von Braun and his colleagues were sent to the United States in what was known as "Project" or "Operation Paperclip." The American Army was at a loss as to what to do with the captured rocket scientists. Consequently, the Germans were settled at Fort Bliss, Texas, where, for the next few years, they shot off old V-2s, played soccer, and dreamed of putting a satellite into orbit.[10]

While the Germans were in Texas, the Soviets were busy developing boosters and other hardware for use in a missile and space program. In describing this period of inactivity in Texas, von Braun said: "The United States had no ballistic missile program worth mentioning between 1945 and 1951. Those six years during which the Russians obviously laid the groundwork for their large rocket program were irretrievably lost."[11]

The Army used the advent of the Korean War in 1950 to gain support for a missile program and the von Braun team was moved to Huntsville, Alabama, as part of that expanded effort. Once in Huntsville, the Germans began working with American scientists, engineers, and technicians on a familiar task—developing missiles for military use.[12]

Von Braun's leadership qualities and his abilities as a team builder helped develop the working relationships needed to mold the Germans and the Americans into one cohesive team. Von Braun was a tall, muscular man who stood out in a crowd with a natural charisma that seemed to draw the atten-

---

9. Walter Wiesman, interview by Mack Herring, Huntsville, AL, January 1962, notes in "Mack Herring's Journal," p. 16, SSCHRC. For a description of "Project" or "Operation Paperclip," see Clarence G. Lasby, *Project Paperclip* (New York: Antheneum, 1971); Bill Winterstein, interview by Mack Herring, Picayune, MS, April 1963, notes in "Mack Herring Journal," p. 22, SSCHRC.

10. O'Neil, "The Splendid Anachronism of Huntsville."

11. *Ibid.*; Roger Launius, interview by Mack Herring, telephone, December 1994. The author learned additional information about the von Braun team in Texas during a telephone conversation with Roger Launius, December 1994.

12. Bergaust, Wernher von Braun, p. 177.

tion of anyone with whom he came in contact. His associates and employees marveled at his ability to remember names and recalled that he expressed an interest in their work and personal pursuits.[13]

A National Goal

During the latter part of the 1950s, Texas Senator Lyndon B. Johnson (1908–1973)(D-Texas) emerged as a key figure in the planning and development of American space policy. He called for a congressional review of the American space program and spearheaded a drive in Congress to create NASA out of the old National Advisory Committee for Aeronautics (NACA). President Eisenhower signed a bill into law on 29 July 1958, supporting this change and creating the powerful new civilian space agency. The conversion officially took place 1 October 1958.[14]

With NASA up and going, additional resources were needed to conduct the proposed space program. NASA first set out to acquire the highly successful von Braun rocket development team at Redstone Arsenal. Initially, the Army balked and offered a counterproposal that would allow the team to work for NASA on an as-needed basis. The Army's proposal was not acceptable to NASA. A firmer commitment to fulfill its mission as an organization dedicated to the "peaceful exploration of space" was needed at NASA. Finally, the Army transferred the 4,000-person Army Ballistic Missile Agency (ABMA) Development Operations Division at Redstone Arsenal, along with the Saturn program, to NASA in July 1960. President Eisenhower christened the new NASA George C. Marshall Space Flight Center (MSFC), in Huntsville, Alabama, named after the respected general who had been Secretary of State and Secretary of Defense, and author of the Marshall Plan.[15]

With the transfer, NASA acquired the big booster capabilities it sought, and von Braun and his colleagues at the ABMA Redstone Arsenal prepared elaborate plans for the development of large rockets for spaceflight. Von Braun was a consistent advocate of an accelerated program to land an

13. Launius, NASA: A History, pp. 32-35; Doris Kearns, Lyndon Johnson and the American Dream (New York: Harper and Row, 1976), pp. 144–45.
14. Launius, NASA: A History, pp. 29–32.
15. Launius, NASA: A History, p. 34; John M. Logsdon, "The Decision," *Look*, special edition, 1969.

American on the Moon as soon as possible. In Washington, however, the Eisenhower Administration preferred a much more measured approach, as the President did not believe spectacular space achievements were the overreaching ingredients of successful international politics.[16]



U.S. President John F. Kennedy set the pace for America's entry into the space race with his famous "second" State of the Union address, which included, "I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth." (SSC Portrait File)

In his 1960 presidential campaign, John F. Kennedy criticized the Eisenhower Administration's lack of attention to the space program. In his campaign speeches, Kennedy stressed the "missile gap," and in his 1961 inaugural address, the new President promised bold, new initiatives "to get this country moving again." Kennedy assigned Vice-President Lyndon B. Johnson the responsibility for space activities and James E. Webb was named NASA Administrator. Webb possessed strong leadership qualities, business savvy, and experience in governmental affairs.[17]

Kennedy might have continued a conservative approach to space matters, but Sputnik and the ill-fated Bay of Pigs invasion of Cuba raised the stakes in the Cold War. Eager to restore America's prestige, Kennedy admitted his mistake in not being better prepared for the Cuban invasion, and he met with people who asked tough questions about how to shift the space program into high gear. Following one such meeting in April 1961, Kennedy drafted a mem-

16. Launius, NASA: A History, pp. 34–35.
17. *Ibid.*, p. 55

orandum to Vice-President Johnson that set the nation on its course to the Moon. In the memorandum, he asked Johnson, chairman of the Space Council, to conduct a complete survey of the country's space program. Kennedy also questioned the nation's ability to compete with the Soviets, and he asked how the United States' space program could excel. Kennedy questioned the quality of efforts to develop "large boosters" and asked Johnson to recommend directions the country should take to ensure early operational capacity. He asked if the United States could beat the Soviets in establishing a laboratory in space, completing a trip around the Moon, landing a rocket on the Moon, or sending a man to the Moon and back to Earth. Kennedy left no doubt that he believed the nation should mobilize in order to beat the Soviets to the Moon.[18]

Indeed, the memorandum to Johnson placed executive expediency on the development of "rockets and boosters," and it stressed that increased effort, strict timetables, and total commitment to a lunar landing mission should be made. Kennedy's memorandum was used in the years to come to justify the monumental decisions by scientists and engineers to plan, build, and operate giant new facilities for the manufacture, test, and launch of Apollo program rockets.[19]

After receiving the President's memorandum, Johnson conferred with scientific, political, and business leaders about a response to the President. He consulted Wernher von Braun, who responded that the country had an "excellent chance" of beating the Soviets to the Moon. Von Braun even predicted optimistic target dates of 1967 or 1968.[20]

Johnson then polled political leaders and searched for supporters. The Vice-President relied on Senator Robert Kerr (D-Oklahoma), chairman of the Senate Aeronautical and Space Sciences Committee, to help calm concerns of other congressional leaders about the usefulness of the lunar landing program. Meanwhile, Johnson responded to the President's memorandum with an "interim" report recommending a lunar landing. As President Kennedy studied Johnson's report, the nation was lifted by the successful

---

18. William Manchester, *One Brief Shining Moment* (Boston: Little, Brown, and Company, 1983), pp. 227 and 233; John Barbour, *Footprints on the Moon* (USA: American Book-Stratford Press, Inc., 1969), p. 6; Launius, "Memorandum for the Vice-President, 20 April 1961," *NASA: A History*, pp. 173–74; Nancy Gager Clinch, *The Kennedy Neurosis* (New York: Grosset and Dunlap, 1973), pp. 185–86.
19. Launius, *NASA: A History*, pp. 60–63.
20. *Ibid.*

suborbital flight of Navy Lieutenant Commander Alan B. Shepard, Jr., on 5 May 1961. The Redstone rocket that Shepard flew had been developed by the von Braun team and was little more than a souped-up version of the V-2. Shepard's flight lasted only 15 minutes, with five minutes in the realm of space. This flight, however, marked the first time an American had been in space, and, more importantly, the entire nation and half the world watched the flight on television.[21]

One of the most interested observers was President Kennedy. In fact, it was the Shepard flight that convinced Kennedy the nation was ready for this bold new endeavor. Kennedy announced on 25 May 1961 that the time had come to go to the Moon. The countdown began for a landing on the Moon before the end of the decade.[22]

The Space Crescent

The lunar landing program breathed life into the "New South" notion first proposed by southern newspaper editors and businessmen following the Civil War. Prior to President Franklin D. Roosevelt's (1882–1945) New Deal, economic change in the New South was non-existent, except for the emergence of textile and steel mills and the enlargement of a few Gulf of Mexico and Atlantic Ocean ports. For all practical purposes, World War II was, for the New South and especially Mississippi, a "watershed" in terms of industrialization and economic growth.[23]

During World War II, the tripartite partnership that developed between the aviation industry, the military air arm, and NACA continued into the jet and guided-missile age. Many military airfields built in the South during the 1930s became permanent fixtures. These military installations attracted aerospace industries from California and the eastern seaboard states. The

21. W. Henry Lambright, *Powering Apollo: James E. Webb of NASA* (Baltimore: Johns Hopkins Press, 1995), p. 182; Al Hall, ed., *A Giant Leap for Mankind*, vol. 4 of *Man in Space* (Los Angeles: Petersen Publishing Company, 1974), pp. 128–29; Lawrence Suid, "Kennedy, Apollo, and the Columbus Factor" (paper presented at American University, Washington, DC, October 1993), pp. 15–16, SSCHRC.
22. Hall, *A Giant Leap*, pp. 128–29.
23. George B. Tindall, *The Emergence of the New South 1913–1945*, vol. 13 of *A History of the South* (Baton Rouge: Louisiana State University Press, 1967), pp. 70–71, 730–31; John R. Skates, Jr., "World War II as a Watershed in Mississippi History," *Journal of Mississippi History*, vol. 37 (May 1975), pp. 131–42.

Southern States grew steadily in importance after 1950 with the addition of the Army's Redstone Arsenal in Alabama and the Long Range Proving Ground in Florida. Both were established as the only feasible locations for many of the dangerous tests leading directly into the chemical rocketry of the ballistic missile years. Transformed by President Kennedy's challenge, the New South gave way to the "Space Crescent," an economic system driven by technology.[24]

NASA knew from the outset that massive manufacturing plants and test, control, and launch facilities would be needed for the giant space vehicles. When the decision was made to implement the Apollo program and go to the Moon, work was under way in Huntsville on a 1.5-million-pound-thrust Saturn I booster. Plans were also being drawn for a much larger booster called the "Advanced Saturn." The new booster, which became known as the Saturn V, was designed to produce 7.5-million pounds of thrust. Conceptual studies were being made for a super rocket, with 12- to 20-million pounds of thrust, known as Nova. Such a rocket could be used for a direct, round-trip mission to the Moon.[25]

To land on the Moon, scientists at several NASA Centers studied three basic schemes: (1) Direct ascent using Nova (go to the Moon and return without orbital rendezvous either in Earth or Moon orbits); (2) Earth-Orbit Rendezvous (EOR) (scheme whereby the major components would be assembled in Earth orbit, with a launch to the Moon from the orbit); and (3) Lunar-Orbit Rendezvous (LOR) (maneuver whereby the craft travels into orbit around the Moon, lands on the Moon's surface, and returns to dock with a mothercraft orbiting around the Moon for the return trip to Earth). After two years of study and debate, LOR was chosen as the method for the lunar mission and Saturn V as the launch vehicle.[26]

It was soon apparent that even the extensive Huntsville MSFC missile-testing facilities were not adequate for testing a Nova-class rocket. Furthermore, Huntsville could not support the rocket booster production schedules required by the rigid timetable of a Moon mission. Serious

---

24. Loyd S. Swenson, Jr., "The Fertile Crescent: The South's Role in the National Space Program," *Southwestern Historical Quarterly*, vol. 71 (January 1968), pp. 382–87; Edward R. Ling, Sr., *The Space Crescent: The Untold Story* (Huntsville, AL: The Strode Publishers, 1984), p. 24.

25. Bilstein, *Stages to Saturn*, pp. 60–74.

26. *Ibid.*

acoustic and possible blast-safety restrictions made expansion of the test facilities at the MSFC in Huntsville prohibitive, thus, the manufacture and test phases were done elsewhere.[27]

In June 1961, NASA and Department of Defense (DoD) teams embarked on a joint venture to evaluate feasible rocket-testing sites. Before choosing the testing site, however, the joint NASA-DoD teams selected a launch site, a site to manufacture space-vehicle stages, and a site for a spaceflight laboratory. Cape Canaveral, Florida, was chosen as the rocket launch site, with a public announcement to that effect on 21 August 1961. First called the Launch Operations Complex, in late 1963 the Cape Canaveral site was renamed the John F. Kennedy Space Center (KSC), commemorating the late President's devotion to space exploration.[28]

On 7 September 1961, NASA selected the government-owned Michoud defense plant near New Orleans, Louisiana, for manufacturing the large space-vehicle stages. The complex spread over 846 acres, offered access to inland waterways, and provided 1,869,020 square feet of floor space. At the beginning of World War II, the Michoud site was selected as a shipyard to build cargo vessels, and a deep-water channel was dredged to link the shipyard with the intracoastal waterway. The shipyard plan was abandoned when the type of ship to be built was replaced by another design.[29]

NASA then announced the "space flight laboratory" would be located in Houston, Texas, on 1,000 acres of land made available by Rice University. The new Texas laboratory would house the Space Task Group, previously located at Langley Field, Virginia. The Texas location, only 35 miles from the Gulf of Mexico, became the Manned Spacecraft Center (MSC), with responsibility for development of the spacecraft, mission control, and astronaut training. In 1973, the MSC was renamed the Lyndon B. Johnson Space Center (JSC) to honor the man that many considered one of the founding fathers of America's space program.[30]

---

27. *Ibid.*
28. Kennedy Space Center, *Kennedy Space Center Story* (NASA Kennedy Space Center, FL: Kennedy Space Center Publications, 1972), p. 4.
29. NASA-MSFC News Release, 21 June 1961, SSCHRC.
30. Henry C. Dethloff, *Suddenly Tomorrow Came. . . A History of the Johnson Space Center* (Washington, DC: NASA, SP-4307, 1993), pp. 39–43; Swenson, "The Fertile Crescent," pp. 386–87.

When the rocket-testing site selection was made in August 1961, the location of the test facility in Mississippi completed a southern, crescent moon-shaped arc, which soon became known as the "Space Crescent." The crescent stretched across the Gulf States, from Houston, Texas, to an apex at Huntsville, Alabama, over to Cape Canaveral, Florida, with the test site located in Hancock County, Mississippi, on the Pearl River.[31]

The location of four new space facilities, in Florida, Louisiana, Texas, and Mississippi, specifically to support the Apollo program flowed from solid reasoning. A great number of airbases had been located in the southern states to take advantage of the warm climate and longer periods of fair-weather flying. These same conditions were needed for testing and launching rockets. The great size of the rockets dictated that they be transported by water along interconnected routes, and the South possessed these in abundance. Finally, powerful southern Democrats with seniority in the Congress obviously had a political bearing on the development of military and space enterprises in the South.[32]

The Space Crescent was to have far-reaching effects on the southern region for many years to come. Money and jobs flowing into the area during fiscal years 1962 and 1963 amounted to almost $2.5 billion, which accounted for one-fourth of America's space budget. During these same two years, over $260 million were committed to construction of the Mississippi test site. The new Mississippi facility created approximately 9,000 new jobs, generating a total annual income of $65 million in southern Mississippi and Louisiana.[33]

Search For the Test Site

The search for a site to test rockets for the Apollo lunar landing program was complex and difficult, but speedily executed. An ad hoc site selection committee was assembled at the MSFC to evaluate possible areas in which to test Saturn and Nova-class rockets. The committee was comprised of two members from NASA Headquarters, with the rest of the members from various elements

31. Swenson, "The Fertile Crescent," p. 388.
32. *Ibid;* Ad Hoc Selection Committee, "Launch Vehicle Test Site Evaluation," 26 August 1961, SSCHRC.
33. Swenson, "The Fertile Crescent," p. 388.

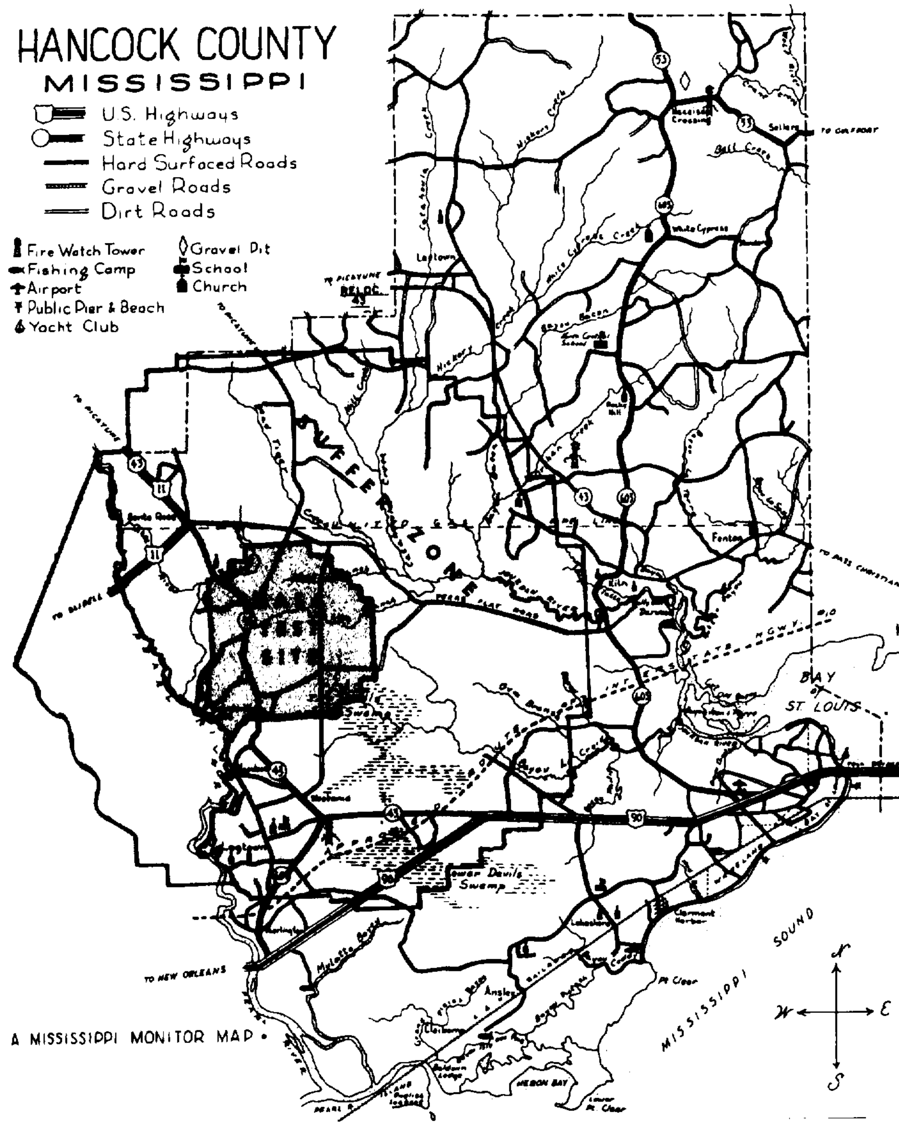
of the MSFC. Their diverse technical backgrounds and expertise proved invaluable in judging the merits of the many sites under consideration.[34]

The committee convened for the first meeting on 7 August 1961, and drafted criteria for the first test site location based on the following assumptions: the Michoud defense plant would be the assembly site for Apollo's Saturn engines (boosters); all production, research, and development vehicles would be tested by the stage and development contractors; Saturn (and Nova) launches would be at the Atlantic Missile Range at Cape Canaveral, where the program schedules would have the highest national priority; and the transportation of related materiel would be by water.[35]

The site selection committee also determined that the ideal test site had to meet these requirements: isolation from populated communities (because of the noise associated with the boosters); accessibility by water and highway; availability of utilities; supporting communities within 50 miles; and a climate permitting year-round testing. The committee screened all existing government facilities fitting the selection guidelines and then eliminated several hundred by map studies. When the committee considered water transportation and isolation criteria, the list was further reduced to 33 potential sites. Additional investigation cut the proposed list to six finalists: New Orleans (at a site 34 miles southeast of the city on the Bayou La Loutre peninsula); Brownsville and Corpus Christi, Texas; Cumberland Island, Georgia; Eglin Air Force Base, Florida; and the Pearl River site in Mississippi.[36]

Members of the committee made some onsite inspections between 9 August and 17 August 1961 in order to improve their existing evaluations. The Pearl River site was among those designated for closer examination. Although not a member of the selection team, von Braun appointed Bernard Tessman, a German colleague at Peenemunde and Deputy Director of the MSFC Test Laboratory, to go on the site evaluation trip to Mississippi. Tessman recalled how unsuspecting the residents were of the intentions of the investigating team. "We made some trips through the Pearl River [site] by boat with the district engineers. We met some people, but they were all so friendly and invited us for a cup of coffee and would ask questions." Tessman said he was

34. Ad Hoc Committee, "Test Site Evaluation."
35. *Ibid.*
36. *Ibid.*



A 1961 map shows the location of the Mississippi rocket testing site, 45 miles east of New Orleans, along the East Pearl River in Hancock County, MS. The 13,800-acre "fee" area, or the fenced-in main portion of the rocket site, is shown in the center. The 125,071-acre acoustic buffer zone extends outward about six miles. (Originally published in the Mississippi Monitor*)*

"shocked" when he visited the Pearl River site. He described it as a wilderness. Tessman recalled that "it was bad back in 1935 in Peenemunde, but Mississippi was even worse for me, because you couldn't walk, you know. Everywhere was water and mud."[37]

After the respective visits, the committee devised an elaborate point system to compare individual features of the six finalist sites. From these calculations, the Pearl River site emerged as the preferable location by a "significant" margin. The final report concluded that the Mississippi site was best because of its location on navigable water, proximity to the Michoud plant in New Orleans (35 miles), sparsely populated area, and closeness to support communities. These findings were forwarded to NASA Administrator Webb on 26 August 1961.[38]

NASA maintained the decision was based purely on the merits of the Pearl River location. Not everyone agreed, and some suggested that Senator Stennis exerted influence on NASA. Stennis's former press secretary and assistant, Rex Buffington, verified that Stennis often spoke of how he asked Senator Kerr, a powerful supporter of the space program, to consider locating some space enterprises in Mississippi.[39]

A.J. "Jack" Rogers, Jr., who later became Chief of Operations at the SSC, remembered yet another version of the site selection process. Rogers, a native of Gulfport, Mississippi, recounted an incident that occurred at the MSFC when he was a young engineer. Rogers occupied an office near the conference room where the meeting of the site evaluation committee transpired. During a coffeebreak, Rogers talked to an acquaintance who served on the committee and showed him the Pearl River site on an old Standard Oil roadmap, an area Rogers traveled as a youngster. Rogers believed the coffeebreak incident caused the Pearl River site to be added to the list of six finalists. All of these stories regarding the selection could be true. Stennis certainly had the political clout to influence the decision, and the Rogers incident could have pinpointed the setting along the Pearl River. In any event, the choice proved to be a sound one.[40]

---

37. Heimburg and Bernard R. Tessman, interview by Charles Bolton, Huntsville, AL, Mississippi Oral History Program, University of Southern Mississippi, vol. 399, 6 March 1992, SSCHRC.
38. Ad Hoc Committee, "Test Site Evaluation."
39. Rex Buffington, telephone interview by Mack Herring, Starkville, MS, December 1994, notes in SSCHRC.
40. A.J. "Jack" Rogers, Jr., interview by Mack Herring, December 1994, SSCHRC.

Not everyone was convinced the Mississippi location was the best choice, or that NASA even needed the facility. Karl Heimburg (1912–1997), director of the Test Laboratory at the MSFC and an associate of von Braun since 1943, believed that one additional test stand, to static fire the hydrogen-fueled second stage of the Saturn V, could be built at Huntsville for $21 million. The additional test stand would solve the "whole problem," Heimburg said, at a savings of $175 million. Heimburg's opinion, however, considered only the requirements of the Saturn V first stage—not those of the Nova rocket, a concept not fully discarded until 1962. Such a rocket could not be tested in the heavily populated Huntsville area. Moreover, without a new site, future production testing would be limited.[41]

In the face of Heimburg's dissenting view, Tessman defended the Mississippi choice. He stated that he was ". . .personally happy. . .that we have the facilities in Mississippi because, after our time, there are some others to come." Tessman then said, "I still hear Wernher von Braun say, 'Tess, don't plan only for today; plan for the future generations.'" Indeed, von Braun, in a letter to George Alexander of *Aviation Week*, revealed that the real purpose of the Mississippi facility was to provide the United States with the capability for captive test firing large space vehicles for "the next 25–50 years."[42]

With the discussions and evaluations finished, the committee concluded its work, forwarding a report to NASA Administrator Webb on 26 August 1961. The public release on 25 October 1961 announcing selection of the Pearl River site came as a surprise to practically everyone. NASA confirmed that it "had moved" to acquire 13,500 acres in southwest Mississippi as a test site for Saturn V and Nova-class vehicles. People in the Pearl River area were shocked to learn that NASA intended to acquire easement rights to about 128,000 acres surrounding the test site, taking in 103,000 acres in Pearl River and Hancock Counties, Mississippi, and 25,000 acres in St. Tammany Parish, Louisiana. The announcement awakened the residents of the sleepy communities along the Pearl River, and left them in a quandary of momentous proportions.[43]

---

41. Heimburg and Tessman, interview.
42. *Ibid.*; Wernher von Braun to George Alexander, 23 December 1965, SSCHRC.
43. NASA-MSFC News Release, 25 October 1961, SSCHRC. It is important to note that the NASA News Release dated 25 October 1961 reflected "round" numbers when it stated: "The National Aeronautics and

---

Space Administration today moved to acquire some 13,500 acres in southwest Mississippi as the site of a static test facility for Saturn and Nova-class launch vehicles. In addition, NASA will acquire easement rights to about 128,000 acres surrounding the test site, taking in 103,000 acres in Pearl River and Hancock Counties in Mississippi, and 25,000 acres in St. Tammany Parish in Louisiana." Because NASA used approximate numbers for the acreage in this press release, some confusion remains as to the actual number of acres acquired. As reflected in I. Jerry Hlass's thesis, "Search For A Role For A Large Government Test Facility," pp. 5–6, the specific number of acres that were finally acquired were "13,428," which were "purchased in fee simple" and the acoustic-buffer zone contains "125,442 acres. . .of which 7,568 acres were purchased fee simple and the remaining 117,874 acres were acquired by perpetual easement." Through the years, however, it has been the "rounded" numbers that were most frequently referred to by NASA officials in public speeches and statements. Because of the differing accounting of the acreage, SSC officials conducted a survey of the fee area and buffer zone land in 1996. The results of this survey, found in the *Environmental Impact Statement for Engine Technology Support for NASA's Advanced Transportation Program,* which states that the fee area is 13,800 acres and that the buffer zone is 125,071 acres. However, the SSC NASA Chief Counsel's office obtained a slightly different version of these acreages from the U.S. Army Corps of Engineers in February 1997. According to the Corps of Engineers the acreage in the fee area is 13,800.15 and in the buffer zone the acreage is 125,001.26.

CHAPTER 2

A Sense of Place

The Setting

Native Mississippian and Nobel laureate William Faulkner described the Mississippi Gulf Coast as an area in which "the pine barrens and moss-hung live oaks give way to grassy marshes so flat and low and treeless that they seem less of earth than water. More of a beginning of the sea than an end to the land." Indeed, the Pearl River meanders like a sluggish water moccasin through the seaboard of Mississippi, creeping by the high bluffs at the site that is now Stennis Space Center. This deep river flows on through pristine cypress swamps, merging downstream with prairies of salt marsh before emptying its dark currents into the sparkling waters of the Gulf of Mexico.[1]

Likewise, the land that borders the Pearl River is part of a low-lying region extending 10 to 20 miles inland from the coastline, aptly named the Coastal Plain Meadows. Because of the region's distinct topography, its streams flow toward the Gulf with only moderate force and become tepid toward the coastline. The soil is gray and sandy, but in the low swampy meadows, where water

1. James B. Meriwether, ed., *Mississippi Essays, Speeches, and Public Letters by William Faulkner* (New York: Random House, 1965), p. 11.

from the small streams and bays usually stands, the soil becomes black and peat-like. The Coastal Plain Meadows give way to a region known as the Piney Woods, where the soil consists of red and yellow sandy loam.[2]

Despite a mild climate, the Mississippi Gulf Coast remains captive to the fickle disposition of Mother Nature. Weather watchers can expect a mean temperature of 68 degrees, an average of 350 frost-free days, and an annual rainfall of 62 inches.[3]

Camille, the most powerful storm ever to strike the U.S. mainland, ripped the Gulf Coast in 1969. Its howling winds, clocked at over 200 miles per hour, created a 27-foot tidal wave that killed hundreds and left thousands homeless. In 1965, however, Hurricane Betsy brought death and destruction to New Orleans and Bay St. Louis, and an unnamed 1947 hurricane left the entire Mississippi coastline in shambles. If it were not for a chain of low, sandy keys, or barrier islands, that serve as a buffer, the coast would fall prey to even more storms and squalls swept toward shore from the deeper waters of the Gulf. The calm, shallow water between the barrier islands and the shoreline, known as the Mississippi Sound, offers a lagoon of modest protection.[4]

Along The Pearl

Indians were the first people to inhabit the lands along the Pearl River, as the natural resources along the river were a lure and a virtual paradise. Evidence indicates they settled in the area 4,000 years before the arrival of European explorers. The Acolapissas, an offshoot of the Choctaws, were living on the banks of the Pearl during the early 1600s. In 1699, Pierre LeMoyne Sieur d'Iberbille, a French-Canadian explorer, sailed up the river from the Gulf of Mexico. He discovered large oysters on its banks and optimistically christened it the "Pearl River."[5]

---

2. *Mississippi, the WPA Guide to The Magnolia State* (New York: Viking Press, 1938), pp. 34–35, 40, 50; For a history of the State of Mississippi, see John R. Skates's *Mississippi, a Bicentennial History* (New York: Norton, 1979).
3. Caroline Keifer, "Hancock County," *Coast Area Mississippi Monitor 1961–1962*, Bay St. Louis, MS, 1962, p. 19.
4. *Ibid.*; Staff of *The* (Biloxi/Gulfport, MS) *Daily Herald*, "The Story of Hurricane Camille" (Gulfport, MS: Gulf Publishing Company, 1969).
5. "Mississippi Will Test The Rocket That Will Put A Man On The Moon," *Mississippi Magic*, Jackson, MS, May 1963, pp. 3–5.

Hancock County, where the NASA Space Center is located, was named after John Hancock, president of the Continental Congress. The first county seat was at Old Center, which stood about one-half mile east of the present community of Caesar. The courthouse was completed in 1817, the same year Mississippi was admitted to the Union, and was moved to Gainesville in 1846.[6]

Three towns, Gainesville, Pearlington, and Logtown, on the Pearl River experienced significant growth during the nineteenth century. These communities were first noteworthy as ports and trade centers for the growing Mississippi Territory. Eventually, the area became known for its large sawmills fed by timber from the vast pine forests of southern Mississippi and Louisiana.[7]

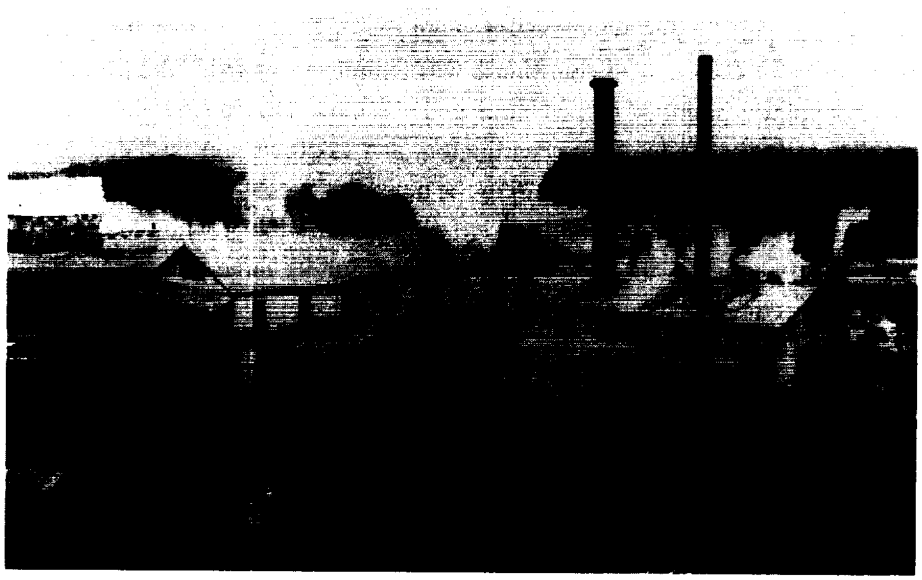
The town of Gainesville received its name from Dr. Ambrose Gaines. In 1810, he came to the area, known then as Cottonport, and found most of the choice property along the Pearl River still available. As a result, he petitioned Spanish authorities for a land grant of more than 500 acres. After acquiring the grant, Gaines laid out a new town he first called Gaines Bluff, but changed later to Gainesville.[8]

An industrious young man, J.W. Poitevent moved to Gainesville in 1832 and established the Pearl River Lumber Company. This sawmill proved to be very successful and Poitevent later moved downriver and opened another mill in Pearlington.[9]

As the logging and timber business boomed, a small sawmill was erected five miles downriver from Gainesville at Logtown. Logtown, originally an Indian site, was settled by early French pioneers who named it Chalons after a city in France; the town was later renamed Logtown by English-speaking settlers. E.G. Goddard of Michigan constructed the first good-sized sawmill in Logtown; and, in 1848, Henry Weston founded the H. Weston Lumber Company, which helped turn Logtown into one of the largest lumbering centers in the United States. At its peak, Logtown had approximately 3,000 residents, and most of them were associated with the lumber business.[10]

---

6. "Historical Resume, Mississippi Test Operations," George C. Marshall Space Flight Center, Stennis Space Center Historical Record Collection at Stennis Space Center, MS (henceforth referred to as SSCHRC), p. 2.
7. Suzanne Grafton, "Formation of the John C. Stennis Space Center" (unpublished paper, University of Southern Mississippi, no date), SSCHRC.
8. S.G. Thigpen, Pearl River: *Highway To Glory Land* (Kingsport, TN: Kingsport Press, 1966), pp. 27–28.
9. Carol Fox, "Gaines Bluff: 19th Century Town" (unpublished paper, University of New Orleans, 1994), SSCHRC.
10. *Ibid.*



The H. Weston Lumber Co. sawmill, founded in 1848, was said to be the largest in the United States. The sawmill was the hub of activity and employment in the community of Logtown, one of five communities that existed where Stennis Space Center is now located. (SSC Roll Negative)

The prosperity of the river towns continued until the coming of the railroads in the latter half of the 1800s. Ironically, the sawmills along the Pearl River furnished most of the timber for the construction of the railroads. These railroads contributed heavily toward the demise of the Pearl River communities and toward the growth of the towns along the Mississippi Gulf Coast—Waveland, Bay St. Louis, Pass Christian, Mississippi City, Biloxi, and Ocean Springs. Sawmills located in Gainesville moved north to locate along the railroad. The town of Picayune was built on the railroad, two miles north of Nicholson, and named after the *Daily Picayune*, a New Orleans newspaper that sold for "one Picayune," the equivalent of a Spanish coin worth 6-1/4 cents.[11]

11. Charles L. Sullivan, *The Mississippi Gulf Coast: Portrait of a People* (Northridge, CA: Windsor Publications, 1985), p. 105; Fact Sheet, "History of Pearl River County" (Picayune, MS: Picayune Chamber of Commerce, ud.), SSCHRC.

The railroads also boosted the prosperity of the resorts along the Gulf, further detracting from the once important Pearl River towns. Hotels and health resorts from Bay St. Louis to Biloxi became even more popular once the railroad opened the way for vacationers and commuters.[12]

By the end of World War I, the great virgin pine forests of south Mississippi had been depleted. The H. Weston Lumber Company at Logtown closed in 1928, ending the economic boom in that town forever. As the towns along the Pearl River struggled to survive the decline of their only industry, the effects of the Great Depression of the 1930s compounded their problems.[13]

Logtown, with 3,000 residents at the peak of the timber boom, could claim only 250 residents in 1961. Gainesville, once the county seat and economic center for the entire area, had only one store left to serve its 35 families and 100 residents. The hotels, stores, taverns, and most of the homes of Gainesville had vanished. The streets and roads that had once been the arteries of a carefully planned town were barely visible in the dense forest on the Pearl River.[14]

Roy Baxter, Jr., was among those in the Logtown area at the time NASA arrived in 1961. Baxter often flew fishermen out to the barrier islands in the Gulf of Mexico on a Cessna 180 seaplane that he co-owned with a friend. On 25 October, he had been to New Orleans to gas up his plane for a fishing trip the next day. While flying home, he looked at his watch and noticed it was time for the five o'clock news from the radio station WWL in New Orleans. Missing some of the report, Baxter heard enough to be alarmed and puzzled as he learned that the federal government was going to acquire vast amounts of land by eminent domain along the Pearl River and build a facility to test rockets bound for the Moon. When he landed and taxied the plane up to its dock, his mother met him on the banks of the river and said, "We've got some bad news."[15]

At first, many people in the Logtown area did not comprehend the full extent of the federal government's plan. Baxter himself looked up the term

---

12. Grafton, "Formation of the John C. Stennis Space Center."
13. *Ibid.*
14. Ron Bailey, *Life Magazine*, 26 September 1964, p. 3; William R. Malkin, interview by Johnny Mann, video tape, SSC, MS, October 1991, SSCHRC.
15. Roy Baxter, Jr., interview by Henry Dethloff, Pearlington, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 422, 24 July 1991, SSCHRC.

"eminent domain" in the dictionary to be sure of its meaning. According to *Webster's Ninth New Collegiate Dictionary*, the term means "the right of the government to take (usually by purchase) private property for public use." Once the town realized the magnitude of the announcement, chaos ensued.[16]

Just up the river at Gainesville, Alton D. Kellar and his neighbors were "shocked," and some never reconciled to the news. The day of the announcement, Kellar's father told Alton, "Moving is for you folk; it's not for me." Kellar responded, "Dad, you know we've all got to move when the government condemns a place like this." His father replied, "Well, you go on." A year later, the senior Kellar died of a heart attack, even as the movers came to jack up his house.[17]

Other longtime residents received the news with mixed emotions. On the one hand, they felt confused and saddened about the prospects of being displaced. On the other hand, they looked to the future and pictured the NASA operation as a positive, economic force for the Gulf Coast. Leo Seal, Jr., president and chairman of the board of Hancock Bank, was one of these individuals. Seal, born and raised in Bay St. Louis, spent most of his adult life in Hancock County and recalled that people in the county received the news in "disbelief." Seal found it difficult to comprehend in 1961 that NASA proposed to spend such an enormous amount of money on the Mississippi project. An ardent supporter of the NASA project from the very beginning, Seal welcomed the test facility with "open arms."[18]

The (New Orleans) Times-Picayune carried a big headline that read "660 La.-Miss. Families Must Leave Testing Site." Without delay, the federal government began the legal action necessary to acquire land for a Moon rocket testing site. The families that had to be relocated lived in St. Tammany Parish, Louisiana, and Hancock and Pearl River Counties in Mississippi. Therefore, the condemnation suits were filed in U.S. Courts in New Orleans, Louisiana, and Jackson, Mississippi, and a timetable of 2-1/2 years was established to complete the removal process.[19]

---

16. *bid.*

17. Alton D. Kellar, interview by Charles Bolton, Hancock County, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 454, 16 July 1993, SSCHRC.

18. Leo Seal, Jr., interview by Henry Dethloff, Gulfport, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 482, 23 July 1991, SSCHRC.

19. "660 La.-Miss. Families Must Leave Test Site," *The (New Orleans, LA) Times-Picayune*, 26 October 1961.

Governor Ross Barnett (D-Mississippi) said he was "happy" to know that NASA decided to locate in south Mississippi. He pledged "full support" of the project and predicted great economic gains as a result of the project. Senator Stennis, at the time a member of the Armed Services Committee and the Aeronautical and Space Sciences Committee, told *The Jackson (Mississippi) Clarion-Ledger* that NASA's decision "puts Mississippi in the space program and gives the state an unusually high military value in the program." He also said, however, that he regretted that families would have to be moved from the area. This aspect of the project concerned the Senator for the rest of his career and played a major role in all of his dealings with NASA.[20]

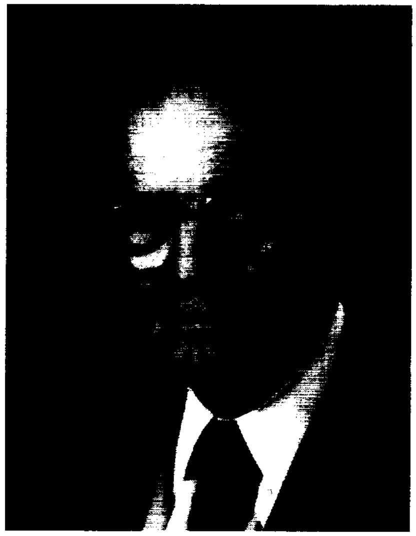
Soon after the effects of dismay and excitement were being felt by residents along the Pearl River and by the state's politicians, news media representatives from Jackson, Mississippi; New Orleans, Lousisiana; and the local area descended on south Mississippi to obtain firsthand reactions. Emotions churned. Some people were ready "to take up arms" to defend their land. Roy Baxter of Logtown drove to Bay St. Louis to confer with Leo Seal, Sr., an influential community leader and personal friend of Senator Stennis. They decided to ask the Senator to meet with the people. Seal telephoned Stennis, and the Senator agreed to a meeting at Logtown on All Saints Day, 1 November 1961.[21]

If anyone had the ability to allay the people's fears and explain the need for the huge new project, it was John Stennis, the junior Senator from Mississippi. In Washington, Stennis projected the characteristics of national pride, self-respect, sincerity, and extreme honesty. In his home state, Stennis exhibited these same qualities. In fact, Stennis's childhood years on the farm, his education in and practice of the law, and a political career dedicated to judicial and patriotic endeavors prepared him to be eminently qualified to help the people of south Mississippi deal with their relocation problems.[22]

John Cornelius Stennis, born 3 August 1901 in the Kipling community located about eight miles south of DeKalb, Mississippi, was educated first at the Mississippi Agriculture and Mechanical (A&M) College (known today as Mississippi State University) and then at the University of Virginia

---

20. "Uncle Sam To Testfire Moon Rockets In State," *The Jackson (MS) Clarion-Ledger*, 26 October 1961.
21. Roy Baxter, Jr., interview by Mack Herring, Pearlington, MS, December 1994.
22. Biographical Sketch, "John C. Stennis, United States Senator," SSCHRC.



U.S. Sen. John C. Stennis was an American statesman and national leader who served in the U.S. Senate for 41 years. In May 1988, the National Space Technology Laboratories was officially renamed the John C. Stennis Space Center by Executive Order of President Ronald Reagan. (SSC Portrait File)

Law School. Stennis was elected to the U.S. Senate in a special election in 1947 after service as a circuit judge, district prosecuting attorney, and state legislator. By the 1960s, his national reputation was such that President Eisenhower considered him to be a man who possessed presidential-like qualities. Others suggested that the Senator's sound judgement and fine legal mind qualified him for the U.S. Supreme Court. Stennis never encouraged these recommendations. Instead, he simply affirmed his desire to serve as Mississippi's "battling lawyer" in Washington. He brought all of these qualities to the Logtown meeting, an event that in many ways defined his senatorial career.[23]

A Promise At Logtown

An estimated 1,500 people congregated on the grounds of the elementary school at Logtown to hear Senator Stennis's speech. Local radio stations had previously announced that Stennis and representatives from NASA and the U.S. Army Corps of Engineers would be present to answer questions about the project. When Senator Stennis and the NASA and Corps representatives

23. *Ibid.*

arrived, they quickly took their positions on the back of a flatbed trailer and spoke from a portable podium borrowed from the school.[24]

Senator Stennis, a noted southern orator, called on his natural talents and, according to some in the audience, spoke from "the bottom of his heart." The outdoor setting, of tall pines and stately live oaks, was familiar territory to Stennis, and he was at his best when face-to-face with his people. "The federal government is ready, willing, and able to pay full compensation for the property involved," Stennis said. "In other places where land has been taken over in like situations by the federal government, it has worked out very well."[25]

Stennis assured the land owners that the government would try to lighten their burden as much as possible. Moreover, Stennis solemnly declared that he was "under personal obligation" to help in the readjustment process. He then called on the patriotism of his fellow Mississippians to help in the nation's fight against Communism. He argued that the world situation was such that the "entire nation must arm to the teeth although there [was] no shooting war" and cited the vital nature of the space race to the success of the Cold War.[26]

"America's superiority of a few years ago with the atom bomb was lost when the Russians got a vehicle into orbit first," Stennis said. "General Medaris's predictions of things to come when the Commies launched Sputnik seemed like fantasy. But developments have shown since, that who controls outer space will control the Free World." Stennis explained that the static engine-testing operation would not be dangerous to area residents and predicted that the benefits from the installation would far outweigh any liabilities.[27]

Perhaps the best-remembered quotation from Stennis's rhetorical appeal to his fellow citizens came when he said, "There is always the thorn before the rose. . . you have got to make some sacrifices but you will be taking part in greatness."[28]

The courtly Senator's speech on All Saint's Day 1961 was a powerful "call to arms" for the residents along the Pearl River. He asked them to give

---

24. "Watch For Speculators," *Rural Electric News*, December 1961, Mississippi edition.
25. *Ibid.*
26. *Ibid.*
27. *Ibid.*; Baxter, interview by Mack Herring.
28. "Watch For Speculators," *Rural Electric News*.

up their land, and even their homes, as a sacrifice in America's crusade against the Soviets. This clarion call carried with it a strong promise that day at Logtown—fair compensation for their sacrifices, and an uncertain glory for "taking part in greatness." Stennis stepped forward that day as their leader and accepted full responsibility for keeping the promises that he made on behalf of his country.[29]

29. *Ibid.*

CHAPTER 3

The Thorn Before the Rose

The Corps

With its own engineers and scientists preoccupied with the development of the space vehicles needed for the Apollo lunar landing mission, NASA secured the U.S. Army Corps of Engineers to be its agent for land acquisition and construction. Proud of its reputation as the "nation's builder," the Corps brought 200 years of construction experience with it when helping to build the facilities needed by NASA for the Apollo program.[1]

One of the most formidable projects in building the NASA infrastructure to support the lunar landing program was the awesome task of obtaining over 200 square miles of land in Mississippi and Louisiana, and then constructing a unique static-testing facility in the midst of a boggy swamp and a desolate forest.[2]

The Mississippi project fell under the purview of the Corps located in the Mobile, Alabama, District, 105 miles directly east of the Pearl River site. The

1. Historical Division, "The History of the U.S. Army Corps of Engineers," *Essayons* (Washington, DC: U.S. Army Corps of Engineers EP-360-1-22, 1991), pp. 1–7.
2. NASA-MSFC News Release, 25 October 1961, Stennis Space Center Historical Records Collection at Stennis Space Center, MS (henceforth referred to as SSCHRC).

Mobile District conducted preliminary investigations for NASA as early as the summer of 1961 and at that time estimated the real estate values. Their report stated that land value was $200 an acre in the 13,500-acre construction area, where a fee interest in the land would have to be purchased; and that it was $75 an acre for the surrounding acoustic-buffer zone easement, where people would be prohibited from living. The Corps listed the cost of needed improvements at $4 million. The total cost of acquiring real estate interests was estimated to be $16,338,000. This estimate exceeded all but one of the other test site locations considered because the Pearl River site was located on land, whereas, the other sites included acoustic-buffer zones over water. The information regarding land values was gathered quietly by the Corps and provided to NASA for use in its classified test site evaluation.[3]

In October 1961, Colonel D.A. Raymond, the Corps district engineer, announced that the Mobile District would be in charge of acquiring the land for the static-testing facility. He explained that the "filing" of proceedings with the federal courts in Jackson, Mississippi, and New Orleans, Louisiana, did not give the government title or possession of the land, but served to inform the public of the eventual operational requirements so further development in the area could not occur prior to acquisition. The filing procedure "froze" real estate values at their fair market price as of 25 October 1961, the day of the NASA press release.[4]

The Corps also notified the public that representatives would soon contact landowners for permission to perform survey work and make subsurface explorations. The Corps of Engineers, of course, had not informed the people of their purpose when they sent agents to conduct the survey during the summer of 1961. Some residents remembered "suspicious" persons in the area at that time, but did not know what they were doing. One Bay St. Louis resident recalled renting a boat to "some strange men" who said they were looking for a site to test rockets. The explanation seemed so "absurd" that the scuttlebutt was discarded.[5]

Colonel Raymond described the borders of the test site for the first time in his October announcement. The first land to be obtained, the "fee simple"

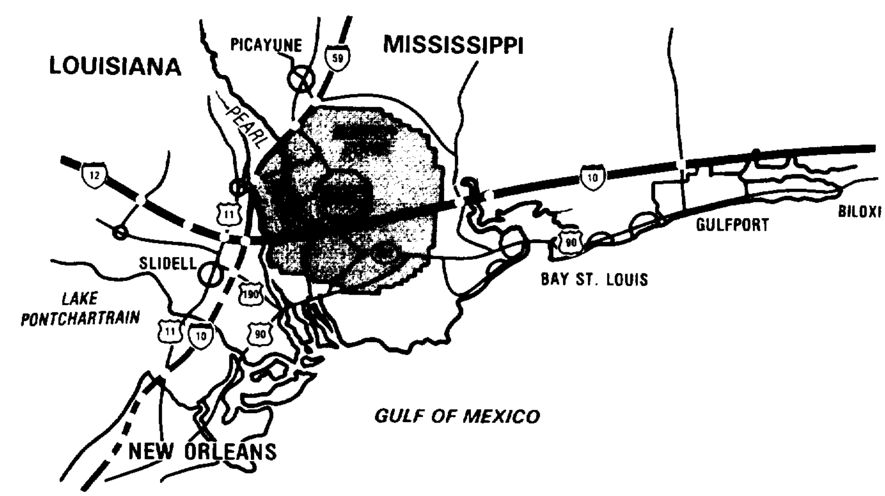
3. Ad Hoc Site Selection Committee, "Launch Vehicle Test Site Evaluation," p. 67, SSCHRC.

4. "Big Moon Shot Test Job for Mobile Engineers," *The Mobile (AL) Press-Register* (henceforth referred to as *The Mobile Press-Register*), 29 October 1961.

5. Bob Torgerson, interview by Mack Herring, Bay St. Louis, MS, 8 January 1995, notes, SSCHRC.

area, was irregular in shape and included the community of Gainesville, extending north and east about five miles in both directions. The proposed "easement area" or acoustic-buffer zone was also irregular in shape, with the northernmost boundary being about two miles south of Picayune, the easternmost boundary about 1/2 mile west of Kiln, the southernmost boundary about one mile north of Pearlington, and the westernmost boundary along the Southern Railway right-of-way and generally along the West Pearl River.[6]

In reality, the fee simple area and acoustic-buffer zone were drawn originally as two circles. The smaller circle represented the fee area where the main facilities would be located, with the larger concentric circle representing the boundaries of the acoustic-buffer zone. The circles were shaped with "irregular" edges, to fit land-surveyed section lines, and geometrically straight lines, usually in half-sections. Mr. C.L.H. "Horton" Webb, secretary and recorder of the ad hoc site selection committee, drew



This current Stennis Space Center directional map shows the main complex or "fee area," the buffer zone, and the center's geographical relationship to the surrounding LA and MS areas. Interstate Highways 10 and 59, which were not built when the site was selected in 1961, are clearly shown in this map.

6. "Big Moon Shot Test Job For Mobile Engineers," *The Mobile Press-Register*, 29 October 1961.

the fee area and acoustic-buffer zone circles based on acoustic information from the rocket tests conducted in Huntsville, Alabama, and at Air Force sites. "If you stand off at a distance and look at a map of the area, it will look like circles on a dart board," Webb explained, "I drew the circles and turned the map over to the Corps of Engineers to shape into land lines [*sic*] that could be purchased."[7]

The circles represented sound levels the rockets would produce in the region. The fee area, or inner circle, was a land tract that scientists projected could receive 125 decibels during a test. The larger circle (buffer zone) could receive approximately 110 decibels. Both of these sound levels could be hazardous to humans and cause structural damage to buildings not constructed to withstand low-frequency sound waves. The buffer zone was also designed to absorb the sound reverberations of approximately 20 million pounds of thrust, sound levels equivalent to the proposed maximum output of a Nova-class rocket.[8]

Construction of facilities for the static-testing facility was scheduled for the area where the government planned to acquire fee simple title. The landowners were told the easement area would be an adjunct to the fee area. The Corps also announced that a project office in the area would handle all phases of the real estate program. Title ownership information would be recorded at the same time appraisals were made for each individual tract of land within the fee area. After the appraisals, the plan called for negotiators from the Corps real estate project office to contact the landowners and reach a monetary agreement. Payment would be made when a settlement was reached. The Corps expected that real estate offers for the fee area would be completed before July 1962, and the residents were told that the real estate policy for the buffer zone would follow the same guidelines. The Corps engineers prepared a booklet describing in detail the steps in the acquisition of the 13,500 acres in Hancock County.[9]

The first real estate booklet was issued in November 1961. The booklets contained basic information, but did not answer the tougher legal questions that would arise during property negotiations. The booklets stated that further

7. C.L.H. "Horton" Webb, interview by Mack Herring, Huntsville, AL, 10 October 1994, notes, SSCHRC.

8. Lelyn Nybo, interview by Mack Herring, Bay St. Louis, MS, 12 January 1995, notes, SSCHRC; Director's Files, "Launch Vehicle Test Site Evaluation," nd., SSCHRC.

9. "Big Moon Shot Test Job for Mobile Engineers," *The Mobile Press-Register*, 29 October 1961.

information would be available from the Corps and furnished to landowners when the Corps agents called upon them.[10]

The little booklets dropped a bombshell as far as Gainesville residents were concerned. They stated that cemeteries in the fee area would be relocated. The main Gainesville cemetery held over 400 graves, many going back to the early 1800s. Another cemetery for African Americans was also located in the Gainesville community. The relocation of these cemeteries, along with the anxiety of upcoming real estate negotiations, further agitated the residents.[11]

The mood of the landowners in the communities had improved greatly after Stennis's Logtown speech and his promise of fair compensation, as most residents believed that Stennis would protect their rights in the negotiations. At the same time, NASA began a program of "community relations" with visits by Marshall Space Flight Center (MSFC) officials. Indeed, the proposed test site became the major topic of conversation in the communities and towns of south Mississippi. U.S. Representative William C. Colmer (1890–1980)(D-Mississippi), chair of the powerful House Rules Committee and representative of the district in which the test site was located, escorted a number of officials from the MSFC on a whirlwind tour of the area. The "get acquainted" visit was intended to promote good relations between the government and the leaders of the communities located around the test site. The group had lunch in Waveland, Mississippi, and inspected the area by motor caravan.[12]

In December, Colonel Raymond named Orrell B. "O.B." Moore as manager of the land acquisition program. In mid-January 1962, Moore opened a real estate project office in Bay St. Louis, Mississippi, that eventually employed 25–30 people. Now with many of the main players in place, the drama of acquiring the land and moving the people of Hancock County to new homes outside the buffer zone began to unfold.[13]

---

10. U.S. Army Corps of Engineers, Mobile District, "Information Concerning Land Acquisition Program for NASA Centralized Testing Site, Mississippi and Louisiana," 23 November 1961, SSCHRC.
11. *Ibid.*; For further information regarding the moving of the cemeteries, see "MSFC/NASA Seek To Save MTF Cemeteries," *Picayune (MS) Item* (henceforth referred to as the *Picayune Item*), 31 January 1963.
12. "NASA Officials Visit Here," *The Hancock County (MS) Eagle*, 14 December 1961.
13. "Moore to Get Land for Missile Testing Facility," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 12 December 1961.

Land Acquisition

"These communities were virtually untouched when we first came in," remembered William R. Matkin, Corps of Engineers land acquisition agent. Matkin arrived in Bay St. Louis in February 1962 and played a key role in the land acquisition process. He negotiated the purchase of lands in the fee simple area and in the acoustic-buffer zone. Matkin remained with the Corps throughout the acquisition process, until the Bay St. Louis real estate office closed in 1968. Matkin developed a camraderie with the landowners, and he remembers how "traumatic" the experience was for people to face the Corps negotiating agents. "A lot of people just didn't want to leave," Matkin said. "Some of these people were born and raised right here in this area, maybe in the same house."[14]

Indeed, sentimental attachment to the land was a major problem the Corps encountered, but another more tangible dilemma hampered negotiations—land merchants who moved into the area. Senator Stennis warned landowners of "speculators" in his Logtown speech, and his warning soon proved true. Speculators moved in almost immediately, buying land in communities surrounding the borders of the test site. As a result, landowners who sold their property at values frozen 25 October 1961 often encountered higher prices when seeking to buy homes and land outside the NASA-designated area. Matkin and other Corps agents understood the dilemma, but the law prevented them from doing anything to compensate the residents.[15]

Land speculators flocking to the area from as far away as Houston, Texas, lacked any attachment to the local landowners or the communities. The speculators were ultimately hoping to sell land to the well-paid NASA employees, whose salaries greatly exceeded the local average. The incoming workers at the NASA site faced a real estate market with inflated prices.[16]

The people of Hancock and Pearl River Counties turned to Senator Stennis many times during the next few years as conflicts arose over land deals, negotiations, and relocation. They were faced with leaving their homes and land

---

14. William R. Matkin, interview by Charles Bolton, SSC, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 393, 4 December 1991, SSCHRC.
15. "Watch for Speculators," *Rural Electric News*, Mississippi Edition, December 1961, p. 9, SSCHRC; William R. Matkin, interview by Mack Herring, Pass Christian, MS, 14 January 1995, notes, SSCHRC.
16. "600 Beautiful Lots," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 27 November 1962.

and entering a new world dominated by high-powered realtors. To make matters worse, the transactions had to be made in haste in order to meet the deadlines imposed by the Apollo lunar landing program, leaving precious little time for sentimentality at the bargaining table.[17]

The Mobile District Corps of Engineers' real estate report stated that 11,900 acres of the test area were owned by large landholding companies, and the remaining 1,600 acres were owned in relatively small parcels. All told, about 150 landowners were affected. The historic, 261-year-old community of Gainesville, which included 91 residences, 2 churches, 2 stores, a nightclub, and a school, fell wholly within the area taken over by NASA.[18]

In the buffer zone, the Corps identified 97,600 acres held in large parcels by owners primarily interested in timber growing, which left 30,800 acres in small farms and homesteads. Acquisition of these easements for the acoustic-buffer zone involved some 2,600 property owners. The buffer zone contained 695 homes, 14 churches, 2 schools, 17 stores, several other commercial buildings, and platted subdivisions containing about 7,600 building lots, of which a number had been sold. The buffer territory also included the romantic old community of Logtown on the Pearl River. Other smaller communities in the buffer zone were Santa Rosa, Napoleon, and Westonia. The estimated total cost of land acquisition then, excluding resettlement and road relocation costs, was $13,800,000. In March 1962, the NASA Headquarters Office of Manned Space Flight (OMSF) instructed the Corps to proceed with its land acquisition plan.[19]

In less than a month, the first real estate settlement was reached between the Corps and a landowner. On 12 April, Mr. and Mrs. Conley [redacted]

17. Matkin, interview by Herring.

18. Mobile District Corps of Engineers, "Mississippi Test Facility Real Estate Planning Report," 12 January 1962, SSCHRC.

19. *Ibid.*; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996, notes, SSCHRC. According to Mr. Jerry Hlass, who at the time of the land acquisition was the NASA Headquarters person for the construction of the MTF, "The total cost that NASA paid for the land including the Administrative cost by the Corps of Engineers totaled $21.5 million for both the Fee Area and the Buffer Zone."

20. "First Option Signed," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*), 19 April 1962.

A few days later, Samantha B. Kellar became the first person to receive payment for her six-room home and 12 acres of land. Corps attorney Carl M. Phillips and Bill Matkin presented her with a check. Mrs. Kellar and her deceased husband's family connection to this land could be traced back four generations.[21]

Not all land negotiations were as cordial as the transactions between the Corps and the Carver and Kellar families. Many landowners felt they were not offered fair compensation for their property. For example, on 22 May 1962, over 250 angry landowners jammed the Hancock County Courthouse to voice their protest at a meeting of the Board of Supervisors. The landowners at the mass meeting elected Dr. James Fargason as president of the "Mississippi Test Facility Landowners' Committee." Named to serve with him on a standing committee were Asa McQueen, Sylvester Moran, Oscar Gelpi, August Holden, Cody Isbell, and Charles Aker. Mrs. Isbell agreed to serve as secretary, and Cornelius J. Ladner volunteered to assist as attorney.[22]

The committee gave the residents a collective voice that captured the attention of politicians, the Corps, and NASA bureaucrats. Perhaps, most importantly, its members kept Senator Stennis in the thick of the fray. Members of the association found that newspaper coverage in Picayune, Bay St. Louis, Gulfport, and New Orleans helped attract attention to their situation. *The (Bay St. Louis) Sea Coast Echo* ran a lengthy editorial siding with the government's land policies, concluding that the landowners were being offered a fair price. The editorial argued that "John Stennis, irrespective of pressure," should not play politics in an attempt to get more money for the property than was being offered as a result of appraisals made by "qualified Mississippians."[23]

Offering a different perspective, *The Hancock County (MS) Eagle* expressed hope that "displaced citizens" would receive just compensation for the "supreme sacrifice" that many were making in giving up their land and family homes. Conversely, the *Picayune Item* took a broader view in an editorial entitled "Don't Wait for Uncle Santa Claus," which urged citizens of Picayune to look to the future and get busy building satellite industries and improving their city's infrastructure in order to capitalize on the new space facility.[24]

---

21. "Mrs. Kellar 1st to Sell," *The Sea Coast Echo*, 3 May 1962.
22. "Land Owners Body Formed," *The Sea Coast Echo*, 24 May 1962. For further information, see "Property Owners Report Concern By Senator Stennis," *Picayune Item*, 8 February 1963.
23. Editorial, *The Sea Coast Echo*, 24 May 1962.
24. Editorial, *The Hancock County (MS) Eagle*, 31 May 1962; Editorial, *Picayune Item*, 7 June 1962.

Senator Stennis found himself in the position of pushing the NASA project forward in his home state, and at the same time serving as an ombudsman for landowners. He answered letters and phone calls, met with landowners and government officials, issued press statements, and made frequent trips to the area to reassure the people that they would receive "full, adequate, and just compensation" for their land. In response to repeated pleas from the residents, Stennis took legislative action on the matters of greatest concern to the landowners.[25]

The two main issues troubling the landowners, who had to move because they had sold or encumbered their property, were (1) relocation costs, and (2) desire by some to sell buffer zone property to the government rather than encumbering it. They maintained the land would be useless to them if they were not present to farm or take care of their holdings. Many residents also wanted to take "the old home place" with them when they moved. Relocation costs became one of the most important demands the landowners expressed through their committee and in letters and direct talks with Senator Stennis.[26]

Troubled by continuing reports that landowners were being exploited, Stennis used the power of his office to help displaced citizens at every turn. The issues of relocation costs and payment options for buffer zone lands were significant, tangible matters that Stennis could do something about. On 2 August 1962, Stennis announced that he had channeled funds into a NASA appropriations bill, which included moving expenses for persons displaced by construction of the static-testing facility. Stennis explained that "this bill authorizes the landowners to be reimbursed...even if the people have already moved."[27]

In early September, Stennis persuaded NASA and the Corps of Engineers to change their policy and allow the displaced landowners the option of selling their property to the government. Originally, the policy only provided for a perpetual restrictive easement for all who owned land in the great expanse

---

25. "Full, Adequate, Just," *Picayune Item*, 17 May 1962; "Senator Stennis Interested In Test Zone Prices," *Picayune Item*, 24 May 1962; "Stennis, Colmer Co-operate," *The Hancock County (MS) Eagle*, 26 July 1962.
26. "Hancock Landowners Complain of NASA Offers," *The Daily Herald*, 12 May 1962.
27. "Stennis Says Moving Expenses Assured," *The Hancock County (MS) Eagle*, 2 August 1962; "Government to Refund Expenses of Moving Incurred by Landowners," *The Hancock County (MS) Eagle*, 15 November 1962.

surrounding the test site. The revised policy, allowing owners the option to sell, included all subdivisions, residences, small farm units, and small acreage tracts. Dr. Fargason said, "The action taken by Stennis [did] much to aid the owners and expedite settlements for the remaining property."[28]

By the end of the summer of 1962, negotiations for all but a few tracts of land in the 13,428-acre fee area had been decided. The Corps granted extensions beyond the original 1 July departure date for people to move their homes and personal belongings from the construction site. The final day for evacuation was set for 1 October 1962, but a few residents lingered on in the Gainesville area until the end of the year. In early January 1963 some rushed to get out, just ahead of the crushing blades of bulldozers and the noisy reverberations of heavy-duty chain saws.[29]

State Highway 43, running through the middle of the future test site, became known during those climactic days as the "Mississippi Trail of Tears." A Native American resident of Gainesville likened the process to the infamous "Trail of Tears" in which the Cherokee nation was all but destroyed on a government-forced march from their lush hunting grounds in the Smoky Mountains of the Carolinas and Georgia to the plains of Oklahoma. After Senator Stennis secured moving costs, large companies with elaborate moving equipment came in to jack up the old homes and move them out. The residents, for the most part, lacked the financial resources to move their dwellings until this action was taken by Stennis. Then, not a day went by that did not see a line of big trucks hauling houses, awkwardly jerking and swaying on trailers, slowly rolling down old Highway 43.[30]

The case of Cora Blue Davis serves as an example of the difficulty experienced during this removal. Ms. Davis refused to leave her home and remained on the front porch in a rocking chair as the movers towed her house to its new destination. Daley Dronet, a housemover from Picayune, personally moved 50 houses out of the fee area and estimated that "about 75 percent" of all the existing houses in the test site were moved.[31]

---

28. "Senator Stennis Announces New Policy for Buffer Zone," *Picayune Item*, 6 September 1962; "Senator Stennis Announces New Policy," *The Hancock County (MS) Eagle*, 6 September 1962.
29. "Gainesville Gets Another 60 Days to Move," Picayune Item, 21 June 1962.
30. *Ibid.*
31. "Houses In Test Area May Be Moved Along Highways," *Picayune Item*, 24 May 1962; "Biggest Housemoving Project In History Of State Coming In MTO," *Picayune Item*, 14 February 1963; Pauline Whitehead, interview by Mack Herring, Hancock County, MS, 26 August 1994, notes, SSCHRC.

Ironically, Gainesville had a final brief gasp of life and became a busy town again. As residents prepared to leave, the Corps arrived to begin construction, and NASA came on the scene to establish a "Space Age" presence. The Corps acquired the last of the big tracts of land when it completed negotiations with the International Paper Company, whose 11,258 acres in the fee zone represented the project's largest single tract. The paper company, the largest employer in the area, sold its property to the government for approximately $1 million. Only one case was left to be settled—the 320 acres owned by Crosby Forest Products of Picayune and leased to another large timber concern, the St. Regis Paper Company. The Corps, however, obtained a "right of entry permit" that allowed it to complete survey work, establish offices, and begin construction. Temporary workspace was established by the Corps and NASA personnel in some of the abandoned houses.[32]

In the end, the beauty, dignity, and good times of Gainesville were preserved in the memories of those who participated in the farewell church services, parties, and visits to favorite places of the heart. Both churches in Gainesville, the Gainesville Baptist Church and the First Baptist Church of Gainesville, held all-day Sunday services on 26 August 1962. Hundreds came to wish each other Godspeed and to take part in the final chapter of the town's history. The services ended at noon and were followed by a "dinner on the grounds," provided by the women of Gainesville who brought their best "dishes." The crowd, estimated to be the largest to gather in Gainesville in 50 years, milled around the old town visiting sentimental landmarks. Many paid their respects at the two cemeteries marked for removal. Here, they saw the graves of Dr. Ambrose Gaines, founder of the town, and L.K. Nicholson, who established the New Orleans newspaper, *The Times-Picayune*. Some walked down toward the Pearl River and took cuttings from the huge wisteria vine touted by a local newspaper as the "world's largest." The giant vine wound its way to the top of a large live oak beside Dr. Rouchon's rustic fishing lodge, soon to house the NASA center's headquarters. Picayune Mayor Granville Williams proclaimed the affair "Gainesville Good Neighbor Day." He was joined by Picayune Chamber of Commerce President Louis McGehee, who extended a "warm and friendly" welcome to all who would migrate north to Picayune.[33]

---

32. "International Paper Signs Pact To Sell Land To NASA," *The Sea Coast Echo*, 25 October 1962.
33. "Hundreds Jam Gainesville To Say Last Goodbyes To Town," *Picayune Item*, 30 August 1962.

Up the road from Gainesville on Highway 43, a farewell party was also held for the patrons of Shorty's 43 Club. The popular nightclub and restaurant was owned by Elwood Andrews and his wife, who lived adjacent to the property. Mrs. Andrews, who operated the business for 16 years, said over 400 people came to the party from as far away as Jackson, Mississippi. After the club was closed, the Andrews moved to Picayune, and NASA turned the building into an "Information Center" for the thousands who soon came looking for jobs.[34]

Officially, Gainesville vanished on 10 January 1962. The town's last 48 hours were marked by feverish activity among the families that stayed on until the end. All property not taken out by nightfall of that day passed to the government.[35]

The last residents to leave the area slept on the premises to prevent pilferage of their property. Journalists, television crews, and curious spectators flooded the busy roads on the final day, while the sun set behind the moss-covered oaks and cypress trees across the river in Honey Island Swamp. A big, white moon came up over the tall pines, lighting the narrow road as the last of the residents made their way up the hill leaving Gainesville and their roots behind.[36]

Anxious to proceed with construction of its rocket testing facility, NASA began moving its own pioneers to the scene, even before the original owners cleared the area. One of the first administrative tasks of the new organization was to deal with the official name of the test site. In those early years, the small "resident" NASA organization stationed in Mississippi used the name "Mississippi Test Operations (MTO)." Later, NASA engineers, who were stationed in Huntsville, and drawing up plans for the structures, called the new site the "Mississippi Test Facility (MTF)." In an effort to settle the confusion, the leaders at the MSFC asked Dr. Robert C. Seamans, Jr., Associate Administrator NASA Headquarters, to settle the issue. Seamans answered by unofficially naming the new facility the "NASA Mississippi Test Operations"

---

34. "Shorty's Place Might Become Engineers' Base," *Picayune Item*, 26 July 1962; Mrs. Elwood Andrews, interview by Mack Herring, Picayune, MS, 16 January 1995, notes, SSCHRC. Electric power became scarce and disruptions common in the last days with most of the Coast Electric Power Association's customers moving out.
35. "Last Families Leave Gainesville as Government Technicians Move in to Launch Great Saturn Job," *Picayune Item*, 1 October 1962.
36. "Television Tells Story of Ending for Gainesville," *Picayune Item*, 17 January 1963.

in December 1961. Nonetheless, some at the MSFC continued to call the site the MTF, while personnel assigned to the Mississippi installation began using the new designation of MTO. This "in-house" name controversy continued, with both names used by the different elements until 1965 when the MTF designation became official.[37]

On 1 October 1962, after making special arrangements with the Navy, Wernher von Braun named Navy Captain William C. Fortune as the facility's first manager. Fortune reported to work immediately from his position as commanding officer of the Naval Air Test Facility at Lakehurst, New Jersey. A graduate of the U.S. Naval Academy, this amiable officer had wide experience in research and development operations, mainly in aeronautics and rocketry. He helped design the launcher for a V-2 that was fired from the carrier U.S.S. Midway in 1946, the first large rocket to be launched from the deck of a ship at sea. He was one of the principal proponents of the 1954 Project Orbiter, a joint Army-Navy proposal to launch a small Earth satellite using the von Braun-developed Redstone rocket.[38]

Fortune quickly earned the respect of both the personnel who served under him and local community leaders. Even though he was allowed to wear civilian clothing by terms of the agreement with NASA, Fortune usually wore his Navy uniforms, something that pleased the military-minded people of the Gulf Coast. According to those who knew him, Fortune epitomized the phrase "an officer and a gentleman."[39]

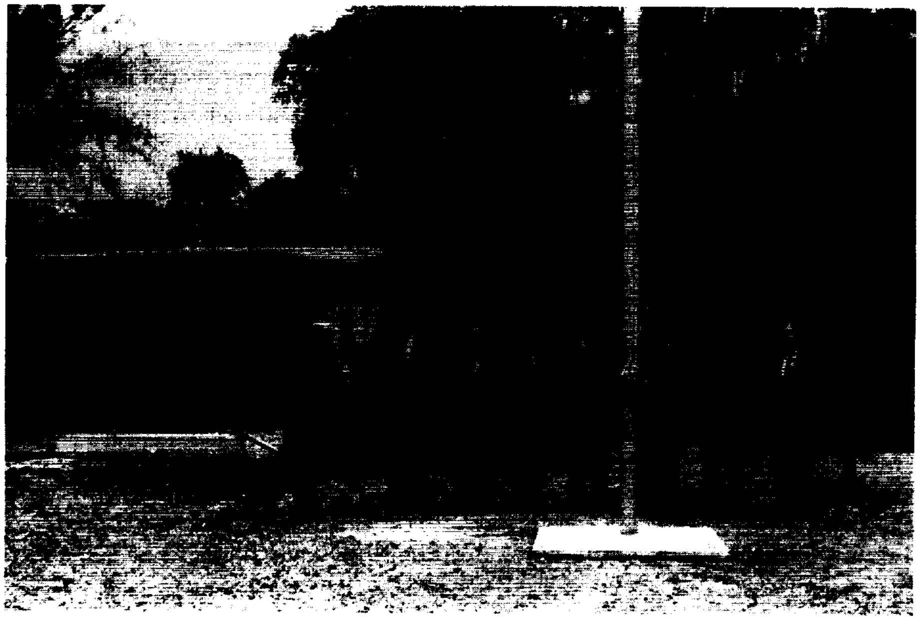
Captain Fortune arrived just in time to participate in the first NASA ceremony held at the MTO, the raising of the American flag and NASA's own colors over the new facility on 20 November 1962. Von Braun and several key members of his Huntsville staff joined Fortune for the event in front of the newly obtained Rouchon House headquarters. Fortune, in good Navy tradition, prepared a special flagpole for the affair, complete with yardarm. Von Braun insisted that Fortune raise the American flag, while von Braun hoisted

---

37. Robert C. Seamans, Jr., to Harry H. Gorman, 10 December 1961, SSCHRC. See also MSFC, Management Manual, "Charter, Mississippi Test Operations," 10 December 1963, SSCHRC.

38. For transcript of conversation during which von Braun offered Fortune the position as the MTO's first facility manager, see *Daily Journal of Werhner von Braun*, 1962, "Telephone Conversation Dr. von Braun/Captain Fortune," 2 February 1962, SSCHRC; MSFC Biographical Sketch, "William C. Fortune Manager of MTF," 1 November 1962, SSCHRC.

39. Leo Seal, Jr., interview by Mack Herring, Gulfport, MS, 27 September 1994, notes, SSCHRC; Roy Baxter, Jr., interview by Mack Herring, 5 January 1995, notes, SSCHRC.



Government officials of the NASA George C. Marshall Space Flight Center (MSFC) raise the American flag for the first time in front of the Rouchon House in 1962 at the Mississippi Test Operations, denoting NASA's presence in south Mississippi. Pictured, from left, are: Bart Slattery, public affairs officer; Dr. Wernher von Braun, MSFC director; Capt. William Fortune, MTO first site manager; Dr. George Constan, Michoud Assembly Facility (MAF) manager; Dr. Oswald Lange, chief, Saturn Program Office; Dr. Hermann Weidner, chief, Structures and Mechanics Laboratory; Mr. Karl Heimburg, director, Test Laboratory; and Dan Driscoll, Test Laboratory. (SSC-97-031)

the blue and gold NASA colors himself. Refreshments were prepared by Margaret (Tingle) McCormick, the first employee hired at the site. Mrs. McCormick's first full day on the job was a busy one as she scurried to meet the needs of the Huntsville dignitaries and local press.[40]

At this gathering, local media and community leaders received their first impression of von Braun. The energetic, renowned rocket scientist gave a

40. "Von Braun Here, Ups NASA Flag," *The Sea Coast Echo*, 21 November 1962; "America's Renowned Space Chief and Aides Inaugurate NASA Test Facility Headquarters," *Picayune Item*, 22 November 1962; *Daily Journal of Werhner von Braun*, 1962, "Von Braun Itinerary" 12–20 November 1962, SSCHRC; "NASA's Office In Charge of Woman With Local Kin," *Picayune Item*, 21 November 1962.

speech to a packed auditorium at Mississippi State University the night before coming to the test site. After the flag-raising ceremony, he lunched with local officials at Annie's Restaurant in Pass Christian and ended the day with another speech at Tulane University in New Orleans. One local newspaper humorously noted that von Braun "moved with the speed of an orbiting astronaut."[41]

Von Braun's visit was not the only NASA noise in the community at that time. A huge 30-foot-tall, 12- by 12-foot-wide acoustical "horn" was brought down from Huntsville to aid scientists in studies of sound propagation in the vicinity of test operations. The giant horn, installed during November, began full-scale operations on 1 December 1962. This horn became part of an advanced atmospheric sounding station, and brought the first wave of NASA technicians into the area. NASA contracted with the Raytheon Co. of Burlington, Massachusetts, to operate the sounding device. As part of the operation, an agreement was signed with the U.S. Weather Bureau to furnish atmospheric data at the times of the soundings. Tulane University was chosen to evaluate, analyze, and correlate data from both sources. The sounding station employed 14 persons from Raytheon and the Weather Bureau.[42]

The Last Of Logtown

The big horn's mournful reverberations were heard all around the NASA site and in the nearby towns. The horn sounded the death knell for the old communities that were sacrificed in the name of progress. As the Corps agents went about their methodical duties of acquiring the 125,442 acres needed to buffer the noise of NASA's rocket testing, the weary landowners continued to meet and share the problems they faced in the land transactions. The restraint of the easement area property owners who met at the Logtown school, and their approach to the final land acquisitions, drew praise on the editorial page of the *Picayune Item*. The 31 May 1962 issue of the paper stated, "We believe

---

41. "Countdown at MTF," *The Sea Coast Echo*, 21 November 1962.
42. MSFC Press Release, 31 October 1962, SSCHRC; "Weather, Sound Tests," *The Sea Coast Echo*, 27 September 1962. For good discussion of acoustic facility work at the MTO, see Lee Paul, interview by Steven Patterson, Bay St. Louis, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 393, 4 december, 1991, SSCHRC.

that the government will recognize this anguished appeal from good, law-abiding American citizens who are yielding in good grace to the demands of the space race, asking only fair treatment by their government. This, we are sure, they will have."[43]

The first real estate settlement in the buffer zone came when Mr. and Mrs. Elvie Dakes Roberson sold their home and 21.9 acres eight miles south of Picayune to the government for $19,500. The most expensive price paid for land in the buffer zone came when the Corps settled with Mr. and Mrs. R.A. Scivique of Bay St. Louis. The Sciviques sold the easement rights for their Star Route Farm, a well-known picnic-catering establishment on Bayou LaCroix, for $370,000.[44]

Of all the land obtained by the government in the easement area, probably the most scenic property was "Parade Rest," on the banks of the Pearl River at Napoleon, home and gardens of Colonel and Mrs. John Wheeler. Parade Rest was such a beautiful estate that it was chosen as the site for a social event held for Senator Stennis on one of his many visits to the area. The Wheelers sold their home and property, in a complex transaction that involved both an easement and a fee simple sale, for a total of $123,000.[45]

Acquisition of the buffer zone required the elimination of the towns of Napoleon, Logtown, Westonia, and Santa Rosa. Approximately 150 landowners were affected, but of the people involved in the land acquisition, probably none were more visibly shaken than the residents of the placid community of Logtown. The town's last day came when the one-room Logtown Post Office was retired on 30 September 1963. Mrs. Lollie Wright, postmistress in the tiny frame building for 36 years, pulled down the American flag and Logtown was no more. All that was left of the once-famous town was its cemetery.[46]

Mrs. Roy Baxter, Sr., one of the residents who went often to the cemetery to reminisce and tend her loved ones' graves paused, just before leaving, and

---

43. Baxter, interview by Herring; "Buffer Property Owners Will Discuss Problems At Logtown," *Picayune Item*, 25 April 1962; Editorial, "Owners Act Restrained," *Picayune Item*, 31 May 1962.
44. "Roberson Sites Sold for $20,000 To Government," *Picayune Item*, 31 May 1962; "Star Route Farm Easement Brings $370,000," *Picayune Item*, 22 August 1963.
45. "Parade Rest at Napoleon Will Live as Beautiful Garden for Tourists," *Picayune Item*, 19 March 1964. Author attended the social gathering held at Parade Rest in honor of the Senator during a visit that Stennis made to the area in the spring of 1963.
46. "Logtown PO End Noted," *The Sea Coast Echo*, 30 September 1963; NASA-MTF Press Release, 30 September 1963, SSCHRC.

said, "It's hard to move old plants. Did you know that? Old plants die when you transplant them."[47]

47. Baxter, interview by Herring; Ronald Bailey, "Moon Race Blots Out a Town," *Life Magazine*, 26 September 1964, p. 4.

CHAPTER 4

Temples in the Swamp

The Task

The challenge of building a Moon-rocket testing facility in the Mississippi mud required a vivid imagination and modern machinery. The promise of unlimited financial resources lessened the difficulty only moderately. The beguiling beauty of the primeval swamp along the peaceful Pearl River presented real problems for both contractors and civil servants who previously worked wonders in Mother Nature's most formidable bastions. Indeed, for the nation's top engineers, the mosquito-ridden, snake-infested quagmire of Devil's Swamp and Dead Tiger Creek proved almost as unconquerable as the jungles of Southern Asia and the desert sands of Saudi Arabia.[1]

Aside from the obstacles of nature, engineers involved in the Mississippi project faced an assortment of design and construction problems. Despite a firm commitment to go to the Moon, NASA officials had not finalized decisions regarding the size and power of the big boosters to be used for the lunar landing mission. The lead engineers at the Marshall Space Flight Center

1. "MTO, Special Report," *Construction News*, vol. 31, no. 10, Special Works Issue (Memphis, TN, 4 March 1964), pp. 16–22, 92–94; Roger E. Bilstein, *Stages to Saturn, A Technological History of the Apollo/Saturn Launch Vehicles* (Washington, DC: NASA SP-4206, 1980), pp. 72–74.

(MSFC) in Huntsville knew the program would require boosters comparable to the new Saturn V, or the more powerful Nova rocket. Consequently, the MSFC engineers began the preliminary design phase with this somewhat ambiguous yardstick in mind. By the time construction began at the Mississippi Test Operations (MTO) in 1963, NASA officials had decided to use the Saturn V for the Moon mission. The Nova rocket never moved beyond the conceptual study stage. Nevertheless, plans for a mammoth rocket such as Nova remained in the overall site design, or master plan, in order to accommodate second- and third-generation space exploration programs.[2]

The mission was to construct test stands capable of static firing the first two stages of the Saturn V. The stands had to be built in time to meet the ambitious launch schedules envisioning landing a man on the Moon in the decade of the 1960s. The first-stage booster, called the S-IC, had a thrust of 7.5-million pounds and each of its five F-1 engines burned for 2.5 minutes—the actual flight time required to place the Apollo Saturn V space vehicle at a 36-mile altitude. The second-stage rocket, the S-II, had a thrust of 1-million pounds. This stage had five J-2 engines that burned for 6.5 minutes, which enabled the vehicle to ascend to an altitude of 108 miles. Both rockets presented special problems for the builders. The first stage, the most powerful rocket ever built in the United States and the larger of the two, was 33 feet in diameter and 138 feet in length. The second stage was also 33 feet in diameter, but only 81.5 feet in length. These rockets, the S-IC manufactured by the Boeing Company at Michoud and the S-II manufactured by North American Aviation (NAA) at Seal Beach, California, were too large to be transported by road or highway, and their sizes also ruled out shipment by air. Specially designed, heavy-duty roads were considered and then discounted for short distances on the test site. Through a process of elimination, water transportation became the only feasible means of transporting the mammoth rockets from the assembly station at Michoud to the test stands in Mississippi. To further complicate design and construction of the test facilities, the second stage, a liquid hydrogen-fueled rocket, required unique ground-support equipment, fuel barges, and piping systems.[3]

---

2. Bilstein, *Stages to Saturn*, pp. 39, 50–53, 58–67.

3. NASA Educational Publication, *Saturn V Manned Flight to the Moon* [Washington, DC: NASA NF-331, vol. IV, no. 5., 1967, Stennis Space Center Historical Records Collection at Stennis Space Center, MS (henceforth referred to as SSCHRC); Leo L. Jones, "A Brief History of Mississippi Test Facility, 1961–1966," comment draft (Huntsville, AL: MSFC History Office, 24 March 1967)], pp. 34–35, SSCHRC.

Although the testing of the Saturn V was the first assignment for the Mississippi facility, the original purpose of the site "was to provide the United States with a capability during the next 20–50 years for captive test-firing large space vehicle systems." The long-range test capability complemented the space vehicle assembly facility at Michoud and an extensive launch capability at Cape Canaveral, Florida. All three of the facilities (Michoud, the MTO, and Cape Canaveral) were government-owned, and, therefore, afforded the government maximum flexibility. Before acquisition of these three facilities, the government relied on manufacturing and test facilities at contractor-owned sites. Consequently, von Braun saw the new acquisitions as "tantamount to an act of faith that the nation wanted a preeminent spaceflight capability, not only until Apollo [program] was completed, but into the indefinite future."[4]

Von Braun's philosophy was in step with the long-range vision of many scientists and political leaders in the country who supported a substantial space exploration program as both scientifically rewarding and as a Cold War necessity. President Kennedy alluded to such a plan in his noted "Urgent National Needs" address in May 1961. Lyndon Johnson harbored such ideas when he first began his work as architect of the civilian space agency (NASA) in the late 1950s. And Senator Stennis echoed these sentiments in his Logtown speech of 1961.[5]

Management, Organization, And Planning

In order to meet the lunar landing objective, NASA developed a complex, but highly effective, management system, which drew on the strengths and experiences of the government's space and aeronautical elements and on private industry. The chain of command at the MTO began in the Office of Manned Space Flight (OMSF) at NASA Headquarters in Washington, D.C., and down through the MSFC at Huntsville. The OMSF set NASA's overall agenda and coordinated the schedules of the various space flight centers.

---

4. Wernher von Braun to George Alexander, 23 December 1968, SSCHRC.
5. Roger D. Launius, *NASA: A History of the U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Co., 1994), pp. 29–30, 175–184.

MSFC, with its honed and highly disciplined organization led by von Braun, was well-prepared to meet NASA's ambitious deadlines. Oddly, the only real problem for the von Braun team was handling the abundant supply of resources that came from the Apollo program coffers. Von Braun once commented, "I knew what it meant to go to the Moon, but I had no idea what a billion dollars was."[6]

The MTO traced its roots to the MSFC's Test Division, directed by Karl Heimburg. The MSFC Facility Engineering Office also assisted and participated in the early planning stages. In early 1962, the MSFC made its first formal attempt to establish absolute control over the Mississippi project by proposing a Gulf Operations organization to manage both the Michoud operations and the Mississippi facility. The plan, which included a detailed organizational structure and elaborate statement of purpose, was never officially accepted.[7]

The MSFC's desire to assert sovereignty over the new test facility led Heimburg to organize within the MSFC Test Division an MTO Planning Office to oversee the construction and operation of the Mississippi facility. Later, von Braun created a Mississippi Test Facility (MTF) Planning Board to serve as managerial arm of the new testing center. On 14 December 1962, von Braun issued a formal charter empowering the MTF Planning Board to "initiate policy and technical direction in the planning, design, construction, and preparation for activation of all portions of the proposed Mississippi Test Facility." Von Braun named Heimburg as chair of the MTF Planning Board, and included Captain Fortune, newly appointed MTO manager, on the board. Fortune answered directly to von Braun on "institutional matters," but was charged with assisting the Planning Board on planning and construction issues. Von Braun also encouraged Fortune to cultivate "community support" for the project.[8]

An MTF Working Group was organized to implement the MTF Planning Board's plans and policies. Bernard Tessman, Heimburg's Test Division deputy director, was named chair of the group. Most of the 46 people associ-

---

6. Bilstein, *Stages to Saturn*, pp. 261–64.

7. Linda M. Martin, "Historical Origins of the NASA Mississippi Test Facility" (Huntsville, AL: MSFC History Office, ud.), pp. 3–6, SSCHRC; Jones, "Brief History of Mississippi Test Facility," pp. 18–19, SSCHRC.

8. Linda M. Martin, "Historical Origins of MTF," p. 7; Charter, MSFC "Mississippi Test Facility Planning Board," 14 December 1962, pp. 1–2, SSCHRC.

ated with the MTF Working Group hailed from the MSFC Test Division and others came from the MSFC Facilities Engineering Office or from the staffs of private contractors. A.J. "Jack" Rogers, Jr., an early member of the MTF Working Group, described the organization as a collection of individuals with test and data, structural and civil engineering, and budgeting experience. In explaining the group's activities, Rogers said, "We got together and developed the requirements that would guide the design and then [worked] to fund the projects." In 1962, the total estimated cost of the Mississippi project was $250 million.[9]

The Huntsville planners retained the firm of Sverdrup and Parcel and Associates of St. Louis, Missouri, for architectural and master planning services. NASA Headquarters approved the selection in March 1962, and in April the contract, valued at $1,342,820, was signed. In consonance with various MSFC elements, Sverdrup and Parcel conducted studies to establish the basic requirements for the MTF. They presented their master test site plan to von Braun in July 1962. With von Braun's approval, the planners continued their work with several modifications, providing site plans, design criteria, and expansion of the support facilities. NASA presented these findings to the Corps of Engineers and instructed them to begin construction. The Corps, in turn, contracted with a number of private firms to design the individual components, about 60 different structures in all, including the huge test stands and the many supporting facilities.[10]

Early conceptual plans for the Mississippi site included facilities capable of supporting a national rocket-testing program well into the future. The preliminary plan provided for test stands for the S-I stage (manufactured by Chrysler Corporation at Michoud), S-IC, S-II, Reactor-In-Flight-Test (RIFT) nuclear stage, and Nova-class stages, in addition to M-1 (liquid hydrogen) and F-1 (RP-1) engines. However, the grandiose plans were scaled down to meet only the testing needs of the Apollo program, using a Saturn V rocket on a Lunar-Orbital Rendezvous (LOR) mission. This verdict eliminated the need for Nova-class rocket facilities. The S-I-stage test facilities remained in the picture until October 1963 when the Saturn I program was canceled, leaving only the

9. A.J. "Jack" Rogers, Jr., interview by Charles Bolton and Steve Patterson, SSC, MS, Mississippi Oral History Program, University of Southern Mississippi, vol. 386, 4, October 1991, p. 6, SSCHRC; Jones, "Brief History of MTF," p. 31.

10. Jones, "Brief History of MTF," pp. 30–34, 42, 45–46.

Saturn IB (a modified Saturn I) and Saturn V vehicles for Apollo program use. Von Braun decided that the S-IB stage would be tested on an existing stand in Huntsville, meaning that only the S-IC and S-II static-testing stands and their supporting facilities would be constructed in Mississippi.[11]

As NASA officials closed the debate in regard to the rocket systems, planners began to concentrate on the "first phase" of construction. The engineers proposed an extended transportation network based upon a system of waterways for moving the stages from manufacturing points on the West Coast and the Michoud plant in New Orleans to the test stands in Mississippi. These plans included dredging 15 miles of the East Pearl River, from the Intracoastal Waterway to the test site; digging 7.5 miles of canals within the main complex; and building a Panama Canal-sized lock system to connect the river with the interior canal system. Development of these waterways was given first priority because of the urgent need to bring heavy construction materials to the site by water.[12]

The plans for the MTO encompassed just about every type of construction that any builder could imagine, from deep excavations in the mud to high-elevation steel work, usually performed on tall buildings and bridges. The major structures included two test stands for the S-II stage and a dual-position stand for the S-IC stage. Plans also called for 20 support and service buildings to sustain all future programs envisioned for the test site.[13]

On the front lines of the construction was the small NASA onsite team headed by Captain Fortune. The team was charged with making the new facility functional and operational. Once the MTO construction and activation were completed, the management team was to serve in a similar, but expanded, role as contractor monitor of the plants manufacturing the rocket engines and stages for the MSFC. The task of assisting in construction surveillance at the MTO was not an overbearing assignment for the small Mississippi team, since the Corps of Engineers had primary responsibility for monitoring the numerous construction contractors involved in building the MTO. Fortune and his group were also expected to plan and carry out a program of community, congressional, and public relations; determine and

---

11. *Ibid.*, pp. 32–33.
12. *Ibid.*, pp. 34–36.
13. A.R. Sorrells, "Mississippi Show Me," *Skyline*, vol. 24, no. 2 (1966), pp. 1–7.

arrange for technical and administrative support; prepare for activation; participate in the initiation of policy and technical direction with the MTF Planning Board at the MSFC; and represent the director, MSFC, in Mississippi and at NASA Headquarters.[14]

The Mississippi Outpost

In the spring of 1963, NASA officials began arriving in Hancock County and quickly established their headquarters in the Rouchon House, a vestige of the old town of Gainesville. At first glance, this setting along the banks of the Pearl River seemed a most unlikely place to begin a space age project. Indeed, the building of the test facility—the largest construction project in the history of Mississippi and one of the largest of its kind in U.S. history—was destined to change the landscape forever.[15]

The early NASA and Corps of Engineers personnel were captivated by the mysterious beauty of the Pearl River and its surrounding areas. The big wisteria vine at the Rouchon House, with its hundreds of lavender blossoms, was in full bloom. The wild magnolias were clearly visible from the narrow Lower Gainesville Road, and an odor of honeysuckle and verbena was prevalent in the fresh air.[16]

Occasional alligators still swam slowly across the river. Smaller water trails were left by numerous cottonmouth moccasins with only their shiny black heads sticking out of the dark, blue-brown river. A distinct "blup" broke the late-evening silence as a largemouthed bass rolled in the river to snap up a falling willow fly. The huge wild pigs, offspring of those living at the time of the Spanish land grants some 200 years before NASA's arrival, were the most dominant daytime creatures. Because of Mississippi's open-range tradition, these boars continued to roam the countryside. Sometimes, the shrill scream of a panther could be heard in the night.[17]

---

14. Marshall Space Flight Center (MSFC) Management Manual, "Charter, Mississippi Test Operations," 1 December 1962, SSCHRC.
15. Sorrells, "Mississippi Show Me," p. 3.
16. *Ibid.*
17. *Mississippi, the WPA Guide to the Magnolia State* (New York: Viking Press, 1938), pp. 31, 40–45.

NASA personnel, coming to the area on temporary assignments from Huntsville, first checked in with Mrs. McCormick and then used the Rouchon House as temporary office space. The porch of this converted lodge was often the scene of NASA and Corps engineers holding meetings and discussions with maps and blueprints spread out on gray government tables obtained from the nearby Michoud plant.[18]

As plans for construction neared completion, community leaders became concerned about the potential impact of a growing population. They requested that NASA provide more information about the number of people expected to move to the area. In February 1963, Captain Fortune appointed Mack Herring, author of this book, as public information officer (PIO). Herring, who served in a similar capacity at the MSFC, was charged with using every public relations tool available to "inform the public of the coming of NASA." Working closely with McCormick, the new PIO gave speeches to civic and church groups, wrote press releases announcing construction of facilities, and met with community leaders to help them understand the impact of the NASA installation. During the early months of 1963, McCormick and Mack Herring received approximately 100 visitors a day. They came to the Rouchon House looking for jobs and in search of business opportunities.[19]

The first NASA engineer to report to Mississippi was Obed E. "Dusty" Batson. Fortune asked Batson, a native Mississippian, to "explore the area" and become familiar with "every inch" of the 13,500-acre site. Fortune obviously wanted to have a more intimate knowledge of the site, over and above what could be derived from the maps, drawings, and journal information gathered earlier by Corps and Sverdrup personnel. "There were no roads then, just State Highway 43 that ran through the area, and the Upper and Lower Gainesville Roads," Batson said, "I would drive as far as I could and get out and walk the rest of the way." After Batson finished his initial exploratory mission, he also assisted the MTF Working Group in determining the exact locations of the numerous buildings and support equipment. Another engineer who was one of the early pioneers of the Mississippi Test Operations was also

---

18. "NASA's Office in Charge of Woman with Local Kin," *Picayune (MS) Item* (henceforth referred to as the *Picayune Item*), 21 November 1962.

19. The PIO referred to in this chapter is the author. Recollections about events and people are reinforced by conversations with persons who were present in 1963. O.E. Batson and Margaret McCormick were consulted on matters referenced here to ensure accuracy.

called "Dusty," O.L. Rhodes. As liaison officer to the Corps of Engineers, Rhodes reported to the site in May 1963 in time to take part in the beginning of the construction of the facility. Like a number of NASA engineers, Rhodes remained until his retirement in 1980 and then continued for seven more years with one of the operating contractors.[20]

The number of NASA personnel in Mississippi continued to grow as Captain Fortune selected additional persons to serve on his staff in preparation for the onslaught of construction and then activation of the rocket facility. New employees included Chester P. Lawless, administrative assistant for property accounting, transportation, and custodial services; Wilmer C. Mabry and B.U. Jones, community relations; William Winterstein, administrative officer; Mary M. Dobson, personnel assistant; Yvonne Loveless, administrative services; and Wilda Stephens and Joyce Owston, assistants to the PIO.[21]

During this evolutionary process, the small group developed a personality of its own. Although the Fortune team had ties to the MSFC, a strong familial bond formed among the members of the Mississippi outpost. Part of this new esprit de corps materialized when members of the Mississippi unit severed ties with the MSFC, moving their families and staking their professional futures at the "outpost" in Mississippi. Conversely, members of the MTF Working Group, and other MSFC elements that exercised management control over the MTO team, remained within the security of their Huntsville positions and chose to keep their families and homes in Huntsville. These decisions apparently planted the seeds for a family rivalry that continues until this day. Indeed, the sibling space centers mused over such mundane issues as official designations. For example, the Mississippi group favored the name Mississippi Test Operations, which was assigned by NASA Headquarters in December 1961. The MTF Working Group, however, continued to refer to the Mississippi development as the Mississippi Test Facility, implying that the facility was simply an auxiliary of the MSFC.[22]

The Corps of Engineers set up their first headquarters in a converted fishing lodge, the Cypress House, located near the NASA Headquarters in the

---

20. Obed E. "Dusty" Batson, interview by Mack Herring, Wiggins, MS, 7 April 1995, notes, SSCHRC.
21. "Key Management Choices Made," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*), 21 March 1963; NASA Mississippi Test Operations Personnel Report, 9 January 1964, SSCHRC.
22. Batson, interview.



From left are NASA's Capt. William C. Fortune, manager of the Mississippi Test Operations (MTO); Charles Jackson, area engineer; Col. Robert C. Marshall, Mobile Corps district engineer; Col. Dave Roberts, deputy district engineer for NASA support; and Col. Charles Palmer, special assistant to the chief of the Facilities Engineering Office; review construction schedules of the Mississippi Test Operations in July 1963. (SSC-63-108)

Rouchon House. As design work progressed and construction starts neared, the Corps named Charles A. Jackson, a veteran engineer with 35 years service, as area engineer in charge of all work at the Mississippi installation. Jackson, a native of South Carolina, started his career as a levee work surveyor and became an expert in heavy construction.[23]

To meet the initial construction and institutional costs of the Mississippi project, NASA proposed a $52,066,896 budget for fiscal year 1963. More than one-half of this sum went to Base Support Facilities and Utilities. By fiscal year 1964, funding had been increased to $111,690,000. The Saturn V First Stage (S-IC) Test Facilities consumed $35,983,000 of the total appro-

23. "MTF Manager, Engineers Are Announced This Week," *The Sea Coast Echo*, 4 October 1962; U.S. Army Corps of Engineers News Release, 2 June 1962, SSCHRC.

priation, and the Saturn V Second Stage (S-II) Test Facilities absorbed an additional $19,148,000.[24]

With money in hand, NASA began construction by building a 16-mile perimeter fence around the sprawling facility. The fence contract, let by the Corps Mobile District, was the first one directly related to construction. In addition, smaller contracts were issued for remodeling the remaining old homes for temporary work space, drilling test wells, and conducting surveys. The perimeter fence project, however, had a high priority because of public safety concerns and the need to protect government property. To supervise the fence project, Fortune hired Harry Guin, a young graduate of the University of Alabama, who became one of the leaders helping to shape the future of the Mississippi project. Guin soon learned that even the fence job, which used ordinary pine poles and barbed wire, was a harbinger of construction woes for the builders working in the swamp. Indeed, the workers, mostly locals from south Mississippi, were stymied by a major attack of swarming salt marsh mosquitos.[25]

Signs Of Progress

When the workmen on the fence project entered the swampy areas, they found the bites of the salt marsh mosquitos unbearable. Fence workers wore long-sleeved shirts, gloves, and mosquito nets over their heads and tried all the conventional mosquito repellents, but to no avail. Guin heard that an inexpensive perfume manufactured in New Orleans would ward off the pesky insects. He bought some of the perfume and provided it to the laborers, but the perfume did little to overcome the problem. Around the complex, survey workers walked off the job because they could not tolerate the stinging bites of the flying pests. Two experts from the U.S. Public Health Service, Clyde F. Fehn and Leslie D. Beadle, investigated the mosquito problem and estimated that an exposed person on the complex received 110 bites per minute. The problem, one of the worst mosquito plagues in years, was widespread along the Gulf Coast.[26]

---

24. C.W. Huth, "Chronological History of the Mississippi Test Facility" (Huntsville, AL: MSFC, 23 June 1966), pp. 11–12, SSCHRC.
25. NASA News Release, 18 March 1963, SSCHRC; Harry Guin, interview by Johnny Mann, October 1991, video history *Way Station to Space*, SSCHRC; See also Guin biography, SSCHRC.
26. NASA News Release, 24 July 1963, SSCHRC; Guin, interview.

NASA soon realized that progress on the construction project would be difficult unless the mosquito assault could be repelled. Consequently, NASA launched a massive counterattack. Two large, specially equipped C-123 airplanes sprayed the entire construction area and buffer zone with chemicals. After the first spraying, the planes then sprayed the Gulf Coast counties with the remainder of the chemicals. Within 10 days, the mosquitos were decimated. The bites were reduced to only 10 per minute, which was considered a "livable condition." Residents of the Gulf Coast welcomed the relief from the mosquito invasion and lauded praise on NASA for its first community "good will" program. Captain Fortune used the occasion to begin organizing a two-state Mosquito Control Commission that continues to serve the Gulf Coast today.[27]

The enthusiasm generated by the arrival of the first train in Gainesville surpassed the excitement of the mosquito conquest. A NASA news release proclaimed that "the first train pulled into old Gainesville today. . . too late to alter history, but just in time to play a big role in the future." Southern Railway System received the contract to bring the 10.5-mile rail-line into the construction site. The railroad company laid the track at no cost to the government for the privilege of serving the construction and operation needs of the test facility. NASA requested that the project be completed by 1 June 1963. Southern Railway started work on 19 March, and the last spike was driven on 10 May—52 days ahead of schedule. Most of the onsite workers gathered at the end of the line to cheer and wave "welcomes" to the train when it rolled to a stop at its new destination. The L-S Construction Company of New Orleans did the grading, drainage, and structures for the track, and the Southern Railway workers laid the track and operated the line. NASA and Corps builders were impressed by the quality and speed of this first big project. The railroad workers went through two large swamp areas. Many predicted that the job could not be finished before the June deadline. Luck, however, was with the workers. Evidence of their good fortune came when they lost only two days to rain—during one of the driest seasons in the area's history.[28]

While the excitement of the record-breaking work on the railroad was a topic of discussion in south Mississippi, another development added to the prestige of the new space installation. NASA announced that it was negotiat-

---

27. *Ibid.*

28. *Ibid.*; NASA News Release, 19 March 1963, SSCHRC; NASA News Release, 10 May 1963, SSCHRC.

ing with the General Electric Company (GE) to provide technical and institutional support for the test facility. Community leaders marveled that such a large company with a national reputation would consider coming to their community. When NASA and GE reached an agreement that fall, expectations for the future soared.[29]

Prior to completion of the railroad project, NASA called a meeting of labor unions and building contractors for 1 May 1963 in an unprecedented move to reach a "no-strike" agreement for construction of the test facility. Billed as a "preventive" labor-relations conference, the meeting was called at the recommendation of President Kennedy's Missile Site Labor Committee, the first such conference ever held. The underlying purpose was to work out advance agreements on wages, hours, and working conditions to ensure that the vital test facility would be built economically, and with labor peace. The committee sought a three-year labor-industry agreement.[30]

Over 100 persons attended the conference, which was held in Gulfport, Mississippi. Representing labor at the conference were delegations from the Building and Construction Trades Department of the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO). Representatives of most of the major building contractors in America attended the conference, e.g., Kaiser Industries, American Bridge Company, Paul Hardeman Company, Blount Brothers Construction Company, International Telephone and Telegraph, Peter Keiwit Company, Rust Engineering Company, Bechtel Corporation, and Morrison Knudson. Most of these large companies were successful in obtaining contracts for work at the Mississippi site.[31]

The lead negotiator for NASA was Paul Styles, a former union representative and NASA industrial-relations officer at the MSFC. Styles, respected and popular with labor as well as industry, brought a colorful, old-fashioned horse-trader's mentality to the bargaining table. Styles used every tool at his disposal to get the job done, including leaking information to the newspapers.[32]

The labor negotiations went on nonstop, shifting from the Mississippi Gulf Coast to New Orleans. Styles had the MTO announce that a three-

---

29. NASA News Release, 18 April 1963, SSCHRC.
30. *Ibid.*, NASA News Release, 28 April 1963, SSCHRC.
31. *Ibid.*, NASA News Release, 2 May 1963, SSCHRC.
32. Mack Herring, the PIO, was assigned by Fortune to assist Styles with labor negotiations and was with him during talks on the Gulf Coast and in New Orleans.

year no-strike agreement between construction contractors and union representatives was negotiated. The unprecedented agreement, reached by the Gulf Coast Contractors Association and the Building Trades Department, AFL-CIO, virtually ensured labor peace during the construction period and was a critical factor in NASA's ability to meet its lunar landing program schedules.[33]

An Unceremonial Beginning

As the labor leaders completed their pact, NASA prepared to stage a ceremony marking the start of work on the MTO project. Von Braun had spoken of a "big" ceremony when he was in the area in 1962 for the flag raising at the Rouchon House. He even hinted that Senator Stennis and "other dignitaries" might participate.[34]

After a meeting with Mississippi Governor Ross Barnett in early April, Captain Fortune announced that a ground-breaking ceremony would be held 15 May and that Governor Barnett would be present. Senators John C. Stennis and James O. Eastland, NASA Administrator James Webb, Wernher von Braun, and many other dignitaries were invited.[35]

Now that the groundwork was laid, the MSFC instructed the Fortune management team to find a suitable location for the tree-cutting ceremony, a place where several helicopters could safely bring in important visitors. The MTO Public Information Office was told that the President or Vice-President of the United States might attend.[36]

Any hopes of a visit by President Kennedy or Vice- President Johnson soon cooled as the spring of 1963 heated up and the civil rights movement spread throughout the South. In fact, federal officials from Washington were reluctant to appear at any public ceremonies in the South for fear of criticism or public demonstrations. In Mississippi, racial strife was intensifying.

---

33. NASA News Release, 21 May 1963, SSCHRC.
34. "Saturn Site. . .von Braun Sees Key Role," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as the *Daily Herald*), 22 November 1962, SSCHRC.
35. *Ibid.*; "Groundbreaking at Test Site on May 15; Barnett To Attend," *Picayune Item*, 11 April 1963; "NASA to Dedicate MTO on May 15, Before Many Honored Guests," *Picayune Item*, 11 April 1963.
36. Batson, interview.

Segregationist Governor Ross Barnett and President Kennedy had recently clashed when the White House supported James Meredith's admission to the University of Mississippi.[37]

In addition, the Civil Rights Commission recommended on 18 April—the same time NASA was planning a ground-breaking ceremony—that Kennedy consider denying Mississippi $650 million in federal funds. The Commission suggested withholding funds in an effort to force authorities in some areas of the state to give protection to those African-Americans involved in the civil rights struggle. The report immediately focused national attention on Mississippi and drew sharp responses from Mississippi Senators Stennis and Eastland. In separate statements, the Senators described the recommendation of the "meddling, busy-body Commission" as "utterly ridiculous and preposterous."[38]

Senator Stennis asserted that members of the two races (African-American and white) lived side-by-side in peace and harmony. He blamed the problems in the state on "paid, organized agitators and headline seekers imported from outside the state." According to Richard Reeves in *Profile of Power*, Kennedy himself was embarrassed and aggravated by the Civil Rights Commission report. Kennedy was getting ready for the 1964 election and knew that he would again need the South in his re-election bid. He was not anxious to lose either the southern white or the African-American votes. At a press conference following the release of the Commission's report, Kennedy said he had been advised that "every case [of civil rights violations] but one" was resolved. According to Reeves the statement was far from the truth, but the press bought it. Kennedy also told reporters that he questioned whether the commissioners were serious people, and he emphasized the unreality of singling out one state for punishment, radical punishment at that—the cutting of federal funding.[39]

After the flurry of news about withholding federal funds from Mississippi, NASA began to hedge on setting a firm date for the site's open-

---

37. NASA Headquarters issued a directive to all field center Public Affairs Offices prohibiting speakers, public appearances, exhibits, and educational programs for segregated audiences. This directive was extended to the MTO. In 1963, most civic clubs and schools were segregated in Mississippi and throughout the South.
38. "Federal Funds Halt Suggested For Mississippi," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 18 April 1963; "Proposal Is Hit By Mississippi Solons," *The Times-Picayune*, 18 April 1963.
39. *Ibid.*; Richard Reeves, *Profile of Power* (New York: Simon & Shuster, 1993), pp. 468–470.



Work crews saw down one of the first trees on 17 May 1963, signaling the beginning of construction of the Mississippi Test Operations in Hancock County, MS. The tree was cut in Devils's Swamp near the site where the construction dock was built on the turn basin of the man-made canal system. (SSC-63-021)

ing ceremony. The newspapers around the state carried stories that the ground-breaking ceremony might be postponed.[40]

The ceremony was planned in connection with the first big construction project, involving a construction dock and dredging of a barge harbor and channel to the site from the Pearl River. T.L. James and Company of Ruston, Louisiana, was awarded a $668,340 contract for this project. Guy Stockstill of Picayune received a subcontract from T.L. James for the clearing work. Without fanfare, pictures, or visiting dignitaries, Stockstill and his men began clearing in the vicinity of Devil's Swamp on 15 May. Captain Fortune, who was in Huntsville at the time, sent a photographer to Mississippi to take pictures of the event two days after it actually occurred. The fact that the massive project got under way without formal ceremony did not seem to bother anyone. On the contrary, the workers were visibly anxious to tackle what they knew to be a very difficult task.[41]

In spite of snakes, mosquitos, and watery sloughs, the clearing project went ahead during May, an unusually dry month. Stockstill's crew leveled 158 acres of Devil's Swamp, using crosscut and chain saws and piling up the stubborn cypresses, oaks, and tall pines with backhoes and tractors. Seven varieties of poisonous snakes, with the deadly cottonmouth moccasins the most numerous, crawled out of the swamp.[42]

---

40. "Set MTO Dig Date," *The Sea Coast Echo*, 11 April 1963; "MTO Groundbreaking Date Is Big Question," *The Sea Coast Echo*, 25 April 1963.
41. NASA News Release, 17 May 1963, SSCHRC; "Army Engineers Invite Bids for Dredging Section of East Pearl," *Picayune Item*, 23 May 1963.
42. Sorrels, "Mississippi Show Me," p. 3; "Confucius Say 'Longest Journey Starts With Single Step'," *Picayune Item*, 30 May 1963.

Sometimes, workers spotted several snakes at one time slithering across the Old Gainesville Road. One day, an HD-21 tractor scooped up a bed of moccasins, and the angry, twisting snakes crawled all over the machine. The operator managed to jump to safety. At the end of each day, the workers tallied up the number of snakes killed and turned the information over to the NASA PIO, who issued the results to the local media. The highest snake kill during the construction period was 85 in one day. Jack Morrison, an amateur herpetologist and early employee of the Boeing Company, captured at least one specimen from each of the seven varieties of poisonous snakes, which included the cottonmouth moccasin, copperhead, diamondback rattlesnake, canebrake rattlesnake, two pygmy species of rattlesnakes, and the coral snake. Morrison displayed them in cages where growing numbers of employees could learn to identify them, in case they were bitten. Pictures were taken of the snakes, and the photos were placed in the emergency rooms of local hospitals to assist doctors and patients in identification. Snakebite kits were placed in strategic locations around the site. Despite all the talk and activity regarding the snakes, only two persons on the complex were bitten by poisonous snakes. Although one man was hospitalized, no fatalities occurred.[43]

With the clearing, dredging, and construction under way, on 13 June, von Braun named Henry F. Auter as Deputy Manager to help Fortune guide the massive project. Auter was an experienced rocket engineer and chief of the Electrical Systems Engineering Branch of the MSFC Test Division. This astute engineer had the confidence of Karl Heimburg and Bernard Tessman, and easily gained the respect of all the technical personnel he worked with at the MSFC.[44]

As deputy manager, Auter served as chief of the planning and activation effort with the MTF Working Group and was instrumental in recruiting many key MTO personnel. Because of his impeccable honesty and absolute devotion to the ideals of the space program, Auter only recruited topflight personnel.[45]

Auter agreed with those individuals who advocated the "Mississippi Test Facility" name and consequently worked to instill its use. He pointed out that the test stands, buildings, and grounds comprised the "facility," while the

---

43. *Ibid.*
44. NASA News Release, 13 June 1963, SSCHRC.
45. *Ibid.*; Auter, interview; Edwin R. Ling, Sr., *The Space Crescent: The Untold Story* (Huntsville, AL: Strode Publishers, 1984), pp. 421–424; NASA *Lagniappe* (NASA/SSC Newsletter), 26 February 1980, SSCHRC.

people who made these elements work constituted the "operations." Nevertheless, in June 1963, the MSFC reaffirmed the MTO designation when it amended the organization's charter. The affirmation prompted more Headquarters and MSFC personnel to use the name. Official correspondence, press releases, and brochures were engraved with the MTO name. Even road signs on the complex carried the MTO designation for the first time.[46]

No Turning Back

Nearly every day during the spring of 1963, the Corps of Engineers announced the awarding of a new construction contract and the roads became cluttered with every imaginable piece of heavy equipment. As a result, people in surrounding communities became more and more aware of the MTO presence. The most significant sign of awareness came when the Mississippi Deep Sea Fishing Rodeo, held annually during the Fourth of July holiday at Gulfport, dedicated its annual event to NASA. To NASA's delight, the Rodeo proclaimed that the dedication would serve as the "official" welcome of NASA to the state. Since NASA had not staged its own ceremony, the fishing rodeo presented an excellent opportunity for NASA to associate itself with the immediate area and the state.[47]

The fishing rodeo was a big event, with over 75,000 persons from Mississippi, Louisiana, and Alabama attending. Hundreds of fishermen ventured out into the Gulf of Mexico to try and land prize catches. NASA set up a large "Space Age" exhibit, which included models and mockups of spacecraft and rockets used, or planned, for the Mercury, Gemini, and Apollo programs.[48]

Governor Barnett, as principal speaker at the Rodeo, embarked on a 45-minute tirade against the federal government for "overstepping its bounds" by encroaching on the sovereignty of Mississippi. Fortunately, the Governor also acknowledged that NASA would be spending "about a half-billion dollars" on its project in Hancock County.[49]

---

46. *Ibid.*
47. NASA News Release, 12 June 1963, SSCHRC; "Deep Sea Rodeo to be Dedicated to NASA in '63," *Picayune Item*, 30 May 1963.
48. *Ibid.*
49. *Ibid.*



An aerial view shows early construction of the Mississippi Test Operations in 1963. The waterway shown is the first leg of the 7 and 1/2 mile long canal system. The East Pearl River is shown at extreme bottom of photo. (SSC-64-174C)

Captain Fortune took advantage of the July holidays to make his permanent move from Alabama to Mississippi, with new headquarters in the Rouchon House. The NASA Information Center became the temporary home and laboratory for test site photographers, directed by Terry Malone. A NASA photographer, Malone gained notoriety for his pictures while working with the Navy combat photographers. Malone's group was responsible for documenting construction activities. These photographs were valuable to the MSFC engineers and NASA Headquarters' personnel for the task of justifying the huge budget before Congress. Some pictures were forwarded to Senator Stennis, whose keen interest in the project was demonstrated by his personal request for biweekly reports on the installation's progress.[50]

---

50. Ling, *The Space Crescent*, p. 80; Hlass, interview.

Soon, the photographers had plenty of assignments as the clearing work extended over the bottom half of the 13,428-acre fee simple area. The sky was filled with smoke in the summer of 1963, as the contractors cut trees on several hundred acres and piled them up in huge stacks for burning. The mosquito problem was brought under control, and the unusually dry conditions in south Mississippi allowed the workers to go full blast on the clearing and excavation projects. The work areas were divided into the Industrial Complex, containing logistical and support services; the Engineering and Administration Complex, with engineering and administration offices, as well as laboratories; and the Test Complex, which functioned as the data collection point. The 66-million-gallon water reservoir testified to the phenomenal engineering feats of the project. Indeed, the mammoth S-IC dual-position stand, rising 264 feet above the ground like a temple in the swamp, with an overhead crane reaching well over 300 feet, was one of the tallest structures in the state.[51]

The Technical Systems work packages were among the largest contracts associated with the construction. These contracts, for designing and installing the technical systems in the S-II and S-IC test complexes and the various laboratories on the installation, amounted to approximately $40 million. The work, managed by the MSFC, was divided into three phases: (I) Instrumentation and Control Systems (ICS) for the first S-II test facilities and the preliminary design of the S-IC ICS; (II) ICS for the S-IC and second S-II test stand; and (III) Technical Systems for a number of support facilities, including the Instrumentation and Materials Laboratory, Components Test Facility, and the Acoustics and the Meteorological Laboratories. The Aetron Division of Aerojet-General was responsible for Phase I, and GE was responsible for Phases II and III. Contracts for the first of the packages were negotiated on 3 July 1963. W.L. "Willie" Shippey was the NASA monitor of the vast and extraordinarily important Phase I Technical Systems installation project. Summers Taylor, who remained at the MSFC, was the monitor of the Phase II and Phase III Technical Systems installation.[52]

---

51. "MTO Special Report," *Construction News*, pp. 16–22; I. Jerry Hlass, "Search for a Role for a Large Government Test Facility" (master's thesis, George Washington University, 1971), pp. 10–24.
52. NASA-MSFC Progress Status Report, "Mississippi Test Operations, Attachment 3," 17 January 1964, pp. 3–4, SSCHRC.

In addition to land-based construction, NASA built a "Navy" of specialized ships, barges, and floating fuel tanks to transport the giant rockets and store the hydrogen and oxygen fuels used by the Saturn V stages. This fleet included three 270,000-gallon liquid hydrogen barges, six 105,000-gallon liquid oxygen barges, two covered barges for transporting rockets through inland waterways, a seagoing ship for transporting rockets from California, and a unique tugboat for moving cargoes within the canal system. The seagoing vessel was named the *Point Barrow*; the stage barges were named *Little Lake* and *Pearl River*; and the jet-powered tug was christened the *Clermont*. The construction of these vessels presented special problems that required personnel and contractors with nautical backgrounds.[53]

Major construction firms from all parts of the country came to Mississippi to help build the massive and unique structures that were needed. The big contractor names included C.H. Leavell Company and Peter Kiewit & Sons of El Paso, Texas; Morrison-Knudsen Company, South Gate, California; and Broadway Maintenance Corporation and Glantz Contracting Corporation, Long Island City, New York. Several smaller contractors, many located on the Mississippi Gulf Coast and in nearby Louisiana, joined in the project as subcontractors—supplying services and equipment for the large builders. The building trades unions along the Gulf Coast and in New Orleans exhausted their rolls of available workers and sent out "help wanted" announcements to union halls around the nation. Free-lance workers heard of the project and came to the area to join the builders. Joe Moran, a sheet metal specialist from Gulfport, remembered the MTO project as "the best work many of us ever had."[54]

As the project progressed, more and more workers from across the nation flocked to the area to join in construction of the test facility. New people arrived every day in need of homes, apartments, and other facilities. Construction workers searched for housing close to the MTO site. Many of these temporary workers settled in Picayune and Bay St. Louis, Mississippi, in hastily prepared villages of house trailers. NASA, Corps of Engineers, and GE employees also took up residences in Picayune and Bay St. Louis, while others gravitated to the Pass Christian and Long Beach areas on the Gulf Coast.[55]

---

53. Hlass, "Search for a Role," pp. 10–24.
54. "MTO Special Report," *Construction News*, pp. 10–22; Moran, interview.
55. Mary Holman, "Economic Impact of NASA's Mississippi Test Facility on Hancock and Pearl River Counties, Mississippi" (Washington, DC: NASA, 1958), SSCHRC.

Most employees wanted to live as close as possible to the site. Picayune, only 12 miles away, and Bay St. Louis and Waveland, 17–19 miles away, were reasonable options. Pass Christian was 26 miles away, but appealing because of its historical and scenic waterfront. Long Beach was 32 miles from the site. Its residents enjoyed what many believed to be a superior school system and reasonable property values. Slidell, Louisiana, only 12 miles from the test site, had already experienced growth due to the NASA Michoud plant and did not attract large numbers of test site workers until Interstate Highway 10 was completed years later.[56]



From left, Capt. William C. Fortune, manager of the Mississippi Test Operations, looks over construction plans with Dr. Wernher von Braun; Col. D. A. Raymond, district engineer for the Mobile Corps of Engineers; and engineer Charles Jackson during one of many visits von Braun made to the facility while construction was under way. (SSC-63-443)

With the large influx of new residents, community leaders and NASA management officials began to anticipate potential problems related to the accelerated growth of the communities. To give the communities and the growing number of workers a boost in morale, von Braun came down from Huntsville for a series of speeches and meetings. On 27 September 1963, von Braun used the dedication of the Corps of Engineers new headquarters building as an opening for his good will visit.[57]

56. *Ibid.*

57. "MTO Will Affect Area Immediately," *Picayune Item*, 20 June 1963; NASA News Release, 24 September 1963, SSCHRC; "Dr. von Braun Raises Colors Over Area Engineer's Office." *Picayune Item*, 3 October 1963.

Von Braun spoke to the test site workers like a football coach getting his team ready for an important bowl game. He told the workers of the importance of the project they were starting and urged them to go "full-steam ahead," like the great river boats in the Mark Twain era. Von Braun even quoted Twain when he said, "When it's steamboat time, you steam!" Building on the analogy, he continued, "When it's rocketship time, you blast off!" Von Braun received a big round of applause from the workers who cheered and tossed their hardhats in the air. Later, Guy Jackson, a speech writer at the MSFC who crafted von Braun's remarks, confided that he fabricated the Twain quotation, but he felt it was appropriate due to the river-town atmosphere of the site's location.[58]

Later on that same September day, von Braun dined with one of south Mississippi's most noted and successful business persons, L.O. Crosby of Picayune. Crosby, who was in the lumber and timber business, was concerned that the higher wages paid to workers at the NASA project might attract his company's best employees. Nevertheless, Crosby was a gracious host, sharing many stories with von Braun. Others attending the luncheon with von Braun included the *Picayune (Mississippi) Item* editor and publisher Charlie Nutter, Captain Fortune, and Mack Herring (PIO).[59]

After the luncheon, von Braun addressed the First Annual Gulf South Livestock and Space Fair in south Picayune. Thousands jammed the grounds to hear von Braun speak. NASA had erected a modest exhibit of models and space hardware for the crowd's inspection. "You have to throw the book away when you are planning your future," von Braun said, "Look to Huntsville for an example. Its growth far exceeded anything anyone would dare predict." Von Braun urged the people to get busy developing new housing, adding new streets, and building new schools for the "thousands" arriving as part of the NASA family. The people in the Picayune area were so excited by the prospects for economic growth, they were soon predicting that the city's population would exceed "20,000 people" in the next few years. The population at the time of the von Braun visit was approximately 7,000. When the installation became fully operational in 1966, the population was about 10,000.[60]

58. *Ibid*

59. The author attended the private meeting with Dr. von Braun, Crosby, Nutter, and Fortune.

60. "Dr. von Braun Raises Colors," 3 October 1963.



Dr. Wernher von Braun greets an enthusiastic crowd of admirers at the Gulf South Livestock and Space Fair in Picayune, MS, in October 1963. During this busy visit, von Braun also spoke to NASA and Corps of Engineers employees, met with local citizens, and addressed a Rural Electrification Administration (REA) Convention in Biloxi, MS. (SSC-63-084)

After the speech, von Braun was rushing to a waiting helicopter to whisk him to Biloxi for a full evening of public appearances when an elderly woman following him called out, "Dr. von Braun! Dr. von Braun! Please autograph my program!" He stopped and signed her program, and then put his arm around her and chatted with the woman for two or three minutes before leaving.[61]

Von Braun enjoyed an aerial tour by helicopter of the testing facility construction site. The helicopter then flew him to Biloxi where he addressed members of the Rural Electric Cooperative Association. Von Braun explained to the gathering how the nation would achieve the lunar landing goal and urged support for the program. While in Biloxi, the scientist held a press conference and said, "Mississippi is now a full-fledged partner in the select group of Space Age states."[62]

61. NASA News Release, 6 November 1963, SSCHRC; Mack Herring Journal, 24 October 1963, SSCHRC.
62. *Ibid.*

The growing number of construction workers on the site necessitated the need for a bank. The nearest financial institutions were located in Picayune or Bay St. Louis, both at least 12 miles from the temporary offices of the construction companies on the NASA site where the payroll checks were handed out. NASA asked the Corps of Engineers to negotiate a lease with the Hancock Bank to provide financial services. In November 1963, a specially built "double-wide" trailer was opened to serve as the site's first bank. Russell Chapman, Doris Carrio, and Eva Smith were the first employees of the Hancock Bank branch. The small "trailer bank" has since grown into one of Hancock Bank's most active branches. Employees of the bank are well-known and appreciated by the installation's workforce and accepted as members of the "space team."[63]

By the end of the year, the second anniversary of NASA's presence on the Gulf Coast, over 800 persons were working at the test site. Communities prepared for the upcoming impact of 6,000 more site employees, who would complete the construction phase. NASA raised its earlier projections of 1,000 permanent personnel to 2,500. That figure would be raised to 3,000 in the final stages of the project.[64]

With the construction project beginning to bustle, the MTF Working Group was assigned a much-needed legal counsel in November 1963. Edwin R. "Ed" Ling, Sr., was appointed by NASA to handle legal matters at the MTO and at the Michoud operations in New Orleans. Ling became a popular member of the MTO staff.[65]

A most unusual occurrence for south Mississippi signaled trouble for the builders when a six-inch snow fell on New Year's Eve 1963. As workers returned after the holidays, they found the construction site grounds soggy and many excavations filled with water from the melting snow. This episode was only the beginning of a long, wet, record-breaking rainy season that stopped construction and raised doubts as to whether the project would be completed in time for NASA to meet its planned lunar landing target date. Indeed, the construction of the test site and the readiness of its Saturn V test stands became the "pacing item" for the Apollo program.[66]

---

63. NASA-MTO News Release, 2 August 1963, SSCHRC.
64. NASA Fact Sheet, "Mississippi Test Facility Economic Impact," July 1965, SSCHRC.
65. NASA-MTO News Release, 8 November 1963, SSCHRC.
66. Jones, "A Brief History," pp. 26–29.

Chapter 5

In Mississippi Mud

Draining the Swamp

America's rocketeers recognized an astronomical fact on their way to the Moon—they had to travel through Mississippi to get there. And on that boggy road leading to outer space, engineers first had to drain a swamp before they could see the fires in the deflector buckets of the monolithic test stands. After achieving great success, the bottom literally fell out of the sky in south Mississippi in 1964. The great craters the workers dug for foundations filled with rainwater and slush.[1]

The Mississippi Test Operations (MTO) employees left work to enjoy the 1963 Christmas holidays, with visions of soon testing shiny aluminum Moon rockets; instead, they returned after New Year's day to find the construction site covered with 6 inches of snow. The big oaks and lesser brush covered with the unexpected, fluffy crystals were an unusually beautiful sight to see. The few makeshift roads forged by the workers and the rutted dirt trails the paper companies used for their skidders were impassable. The giant holes dug to encase the reinforced concrete and steel foundations for

1. "Weather Stalls MTO," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*), 2 January 1964.

the test stands had water standing in them. One of the bigger holes was referred to as "Lake NASA."[2]

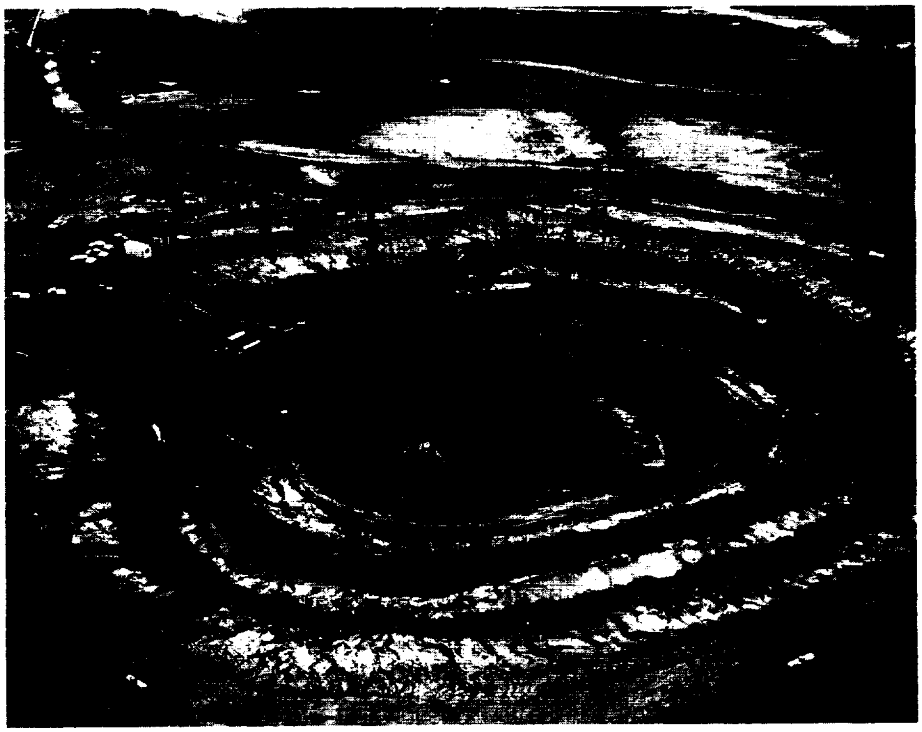
The record dry spell of 1963 turned into a record downpour during 1964, with torrential rains breaking a 30-year record. The crews knew in advance that they would be working in one of the nation's wettest regions where annual rainfall could exceed 60 inches. But, they did not anticipate the additional 20 inches that fell during 1964, turning the topsoil into a sticky gumbo-mud that sank their draglines, tractors, and trucks in over their axles. NASA had to use surplus Army halftrack troop carriers to transport employees to the work sites. Pumps chugged at full-throttle to pull giant puddles of water out of the excavations.[3]

The engineers and managers, who were to put the giant Saturn V first- and second-stage rockets to the test, shook their heads in dismay when they reported back to work after the holidays and surveyed the dripping wetness. By month's end, 9.5 inches of rain had fallen, and most work was completely halted. Several feet of water stood in the bottoms of the excavations for the navigation lock and in the giant holes dug for the foundations of the A-2 and B-1/B-2 static test stands. The bosses at the Greenhut Construction Company, contractor for the test stand foundations, wondered when they could continue their work. They had excavated 410,000 cubic yards of dirt, but they still had 1,670 steel and concrete pilings to drive before they could begin pouring the huge concrete and reinforced steel substructures. Indeed, Greenhut's March completion date was in jeopardy.[4]

The bleak outlook for contractors facing more rain and work slowdowns contrasted sharply with a 1963 year-end summary given by Captain Fortune, who was "satisfied with the progress" of the project. The gentleman observed, "The work is moving along fine. The dry weather has been to our advantage, and we are really moving dirt out there in the harbor, the canal, the lock, and the big missile site. We are moving as fast as the funds are made available." In a humorous postscript, Fortune quipped, "We have dug a lot of big holes, now we have to fill 'em up!"[5]

---

2. "Operation Mudhole," *The Picayune (MS) Item* (henceforth referred to as the *Picayune Item*), 23 January 1964.
3. "9.5 Inches of Rain Bog MTO Work," *Picayune Item*, 30 January 1964; "Significant Problems Encountered," Henry Auter working papers, pp. 1–2, Stennis Space Center Historical Records Collection at Stennis Space Center, MS (henceforth referred to as the SSCHRC).
4. "MTO, The Big Year," *Construction News*, vol. 31, no. 10 (4 March 1964), pp. 17–23.
5. "Fortune Satisfied with MTO Progress," *Picayune Item*, 21 November 1963.



An enormous crater marks the site where the A-2 test stand was being built in 1964 at the Mississippi Test Operations. The dark rim of gumbo mud around the excavation is the remains of an old river bed, which some geologists believed was the ancient path of the Mississippi River. (SSC-64-652C)

One of the first NASA visitors to see the muddy mess was Jerry Hlass, an engineer dispatched from NASA Headquarters to manage the construction in Mississippi. Hlass later reflected, "Members of a congressional committee were puzzled by a photograph we had supplied them . . . . They asked what the huge hole was in the picture with cars and trucks parked all around the outer edge. It turned out the picture was of the excavation for the S-IC test stand and the cars and trucks were stuck in the mud!"[6]

6. NASA News Release, "Biography of Jerry Hlass," 1976, SSCHRC; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 2 August 1995.

Hlass worked closely with the engineers and budget managers at NASA Headquarters, the MTO Working Group in Huntsville, the Corps of Engineers, and Captain Fortune and his small onsite MTO staff. Hlass also had the important assignment of assembling a biweekly report on the Mississippi project for Senator Stennis. Jerry Hlass would return many years later to make even greater contributions as manager of the static-testing facility and as center director.[7]

The Work Quickens

Even the great rains of 1964 did not dampen the spirits of NASA and Corps of Engineers personnel and the growing number of construction contractors at work all over the 13,500-acre construction site. One count showed 30 draglines at work at one time. Foundation work began to take place where the giant test stands would rise in the Saturn V Test Complex. The "clang-clank" sound of pile drivers could be heard a mile away from the area as they hammered hundreds of steel beams, some 110 feet long, into the mushy, peat-like soil, pounding through thousands of years of geologic history.[8]

Taking full advantage of a lull in the rainfall, builders worked around the clock trying to recover the time lost earlier. Over 851 cubic yards (about 3-million pounds) of concrete were poured during a 16-hour period to form one of the piers for the bascule bridge (a balanced drawbridge) crossing over the navigation lock at the south end of the site. Workers and community residents called the job "Operation Big Pour." Three concrete batching plants operated seven days a week to handle the demands of the builders, who were taking advantage of the rare Mississippi winter sunshine.[9]

Structures began rising all over the site, as the bright orange-painted steel frames of the buildings appeared in the clearings. Trucks, tractors, and a wide variety of earth-moving machines groaned along muddy roads and trails, hauling concrete, dirt, and steel. Tractors strained to pull trucks and other

---

7. Hlass, interview.
8. "MTO Progress is Evident to Eye," *Picayune Item*, 13 February 1964; "MTO, The Big Year," *Construction News*, pp. 17–23.
9. "Pour Pier for Bridge at MTO Between Rains," *The Sea Coast Echo*, 6 February 1964; "Operation Big Pour Sees 851 Yards of Concrete Dumped to Form 1st Step of MTO Bascule Bridge," *Picayune Item*, 6 February 1964.



These large concrete walls were erected as part of the navigation lock and bascule bridge which was and is part of the waterway system used to transport propellants and rocket stages on barges. The navigation lock portion of the canal system is located at the south entrance into the SSC. (SSC-64-666C)

vehicles out of the soggy morass, and the blue glow of welding torches flickered in the forest like fireflies. Floodlights lit up the work areas so the workers could work around the clock. At dawn, workers huddled around shiny, silver-bodied food trucks, affectionately called "roach coaches," clutching styrofoam cups of steaming-hot New Orleans blended coffee, excitedly talking about "the damn rain" and the impossible schedules laid down by "them crazy NASA cats." The workers exchanged "see ya's" as the shifts changed, sending craftsmen to their homes in Picayune, Slidell, or on the Gulf Coast.[10]

10. "MTO Progress Is Evident To Eye," *Picayune Item*, 13 February 1964; Audrey Faye Bufkin, interview by Mack Herring, Bay St. Louis, MS, 5 July 1995.

After a hard day's work at the construction site, the commute home was not an easy one. During the early years, the construction site was accessible only by two-lane highways. While the crews were busy building the test facility, news of another construction project south of the NASA site gave weary workers something to look forward to—the laying of Interstate Highway 10 through the southern buffer zone and the Honey Island Swamp. Survey crews started surveying the route in the winter of 1964 for the east-west nationwide artery and announced that the high-span highway bridge across the Pearl River would be part of the project. NASA requested that a bascule-type bridge be built, so the large rocket boosters could be transported up the river to the test site and back down the river after testing. NASA placed $4.5 million into the federal-state road fund to cover the special span across the Pearl River.[11]

Boom Towns

NASA was keenly interested in the development of the towns around the test site, for they would become the future homes of their site employees. The construction workers were looking for temporary homes in the surrounding communities, while the NASA and Corps of Engineers personnel sought permanent homes.[12]

At the urging and with the assistance of NASA, a Regional Planning Commission was organized in hopes of ensuring an orderly growth of the area. The first meeting of community leaders was hosted by NASA at its Information Center. B.U. Jones and Bill Mabry helped leaders in the communities organize the commission. The Planning Commission was comprised of representatives from the Pearl River, Hancock, and Harrison Counties in Mississippi and St. Tammany Parish, Louisiana. Special legislation was passed in Mississippi and Louisiana allowing the county and parish representatives to participate as a "regional" two-state commission.[13]

---

11. "Agencies Agree On Location Of Interstate Bridge," *Picayune Item*, 19 March 1964.
12. Roy L. Bullock, "Mississippi Test Facility Utilization Data," executive study, NASA Headquarters, attachment 3, 1968, pp. 1–5, SSCHRC; Michael Kent, "Space Activity In An Agrarian Economy," MSFC management study, 1963, p. 9, SSCHRC.
13. "MTO Planning Unit Appointed," *The Slidell-St. Tammany (LA) Times* (henceforth referred to as *The Slidell Times*), 6 February 1964.

State Representative Walter James Phillips of Hancock County said the Planning Commission would enable the Mississippi Gulf Coast area to "plan facilities for the great influx of population due to the Michoud plant in New Orleans and the Mississippi Test Operations of NASA." Phillips further noted that "an immediate benefit will be to provide for mosquito control measures and provide a way to finance such a project."[14]

Phillips was joined by the entire delegations of Pearl River, Hancock, and Harrison Counties in support of a bill allowing the counties to participate in the two-state commission. Meanwhile, Joseph V. Colson, Waveland realtor and merchant, was elected the Planning Commission's first president. Other officers were chosen to represent the three Mississippi counties and the Louisiana parish.[15]

NASA's strong interest in community affairs increased as the site began to dig out of the mud and show signs of dramatic growth. As the rains subsided, contractors at the site added more workers in hopes of making up lost time. NASA announced on 1 April 1964 that more than 1,000 workers were on the site—683 of them engaged in construction. The small NASA cadre was 34; General Electric (GE) and its subcontractors, 109; Corps of Engineers onsite, 126; Corps of Engineers, Bay St. Louis, 37; Raytheon, 6; Weather Bureau, 8; Hancock County Security Patrol, 6; and 1 each with North American Aviation (NAA), Boeing Company, and Sverdrup and Parcel.[16]

Marion Kent, of the MSFC, had great influence on the community leaders during the MTO's early growth. Kent came down to Mississippi to help coordinate community programs with local area officials. He prepared several reports and studies on the impact of the new space installation in Mississippi. These reports proved helpful in later years, serving as a "baseline" guide in developing new programs. Leo Seal, Jr., Hancock Bank president and CEO, remembers Kent as a man with authority and responsibility; someone who would "answer questions" from local residents and listen to the community leaders as they all prepared for the NASA impact.[17]

---

14. "Official Status Will Be Sought For Commission," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 27 February 1964; "NASA-MTO Area Planning Group Elects Officers," *Picayune Item*, 27 February 1964; "Planning Unit For MTO Asked," *The Daily Herald*, 4 March 1964.
15. "NASA-MTO Area Planning Group Elects Officers," *Picayune Item*, 27 February 1964; "Planning Unit For MTO Asked," *The Daily Herald*, 4 March 1964.
16. "Workers At Mississippi Test Operations Pass 1000 Mark For First Time," *Picayune Item*, 2 March 1994.
17. Edward R. Ling, Sr., *The Space Crescent: The Untold Story* (Huntsville, AL: The Strode Publishers, 1984), pp. 58–64; Leo Seal, Jr., interview by Mack Herring, Gulfport, MS, 27 September 1994.

Kent and other NASA officials offered some innovative planning to the people of south Mississippi. A map drawn by the MSFC Master Planning Office outlined a model city that could be built around the historic community of Pearlington at the mouth of the Pearl River. NASA expected Pearlington to be a desirable location for test site workers because of its location nine miles south of the installation. A large number of former residents of Logtown, Napoleon, Gainesville, and Westonia elected to live in Pearlington, because they could remain close to their old homeplaces.[18]

The NASA model city plan for Pearlington included zoning for residential and business areas, plus motel, hospital, small industry, park, high school, and elementary school locations. The design even called for a civic center along the banks of the Pearl River. A similarly planned community was under construction in Clearlake, Texas, near the NASA Manned Spacecraft Center (known today as the Johnson Space Center). The Pearlington plan was presented by NASA officials to community leaders in Hancock County, and the concept did stimulate some serious thought. The plan, however, never materialized, and the planned city was never built. Employees generally selected the existing communities, with schools and municipal assets already in place.[19]

As giant structures slowly arose at the test site, more and more workers arrived to rush the project along. The presence of new workers provided encouragement to local community and business leaders, who awaited the promised prosperity. Captain Fortune announced on 18 June 1964 that over 2,000 persons were working at the site, an astounding increase of 1,000 workers in just over two months. Even with the slight break in the rainy weather and the increase in construction personnel, the lagging schedule began to worry Corps of Engineers officials, who quietly issued warnings that the project was falling behind.[20]

The increased activity, however, brought NASA and other government officials down to south Mississippi to see the landmark construction project in full swing. Senator Stennis made trips during the summer to survey the work and meet with local community leaders. Fortune briefed the Senator on

---

18. MSFC Master Planning Office, *Pearlington As A Planned Community*, map, color artist concept, SSCHRC.
19. *Ibid.*
20. "Total of 2,000 Persons Now Are Working At MTO Site," *Picayune Item*, 18 June 1964; Leo L. Jones, "A Brief History Of The Mississippi Test Facility 1961–1966," comment draft, (Huntsville, AL: MSFC Historical Office, 1967), p. 57, SSCHRC.

the project in a makeshift conference area—once the dance floor of Shorty's 43 Club. Von Braun brought Washington officials to see the progress and to make them aware of potential problems. The famed rocket scientist, obviously proud of the engineering miracles being worked in the swamp, made several inspection trips during the summer of 1964, escorting Dr. Robert C. Seamans, Jr., NASA Associate Administrator; George E. Mueller, Associate Administrator for Manned Space Flight; members of the NASA Manned Space Flight Advisory Council; and several members of his own staff from the MSFC.[21]

Von Braun, during a visit to the area, said that the testing facility would grow and become more important "as time goes on." He linked his observation to an appeal for Mississippi to develop both its schools and citizens for the "great space program," so Mississippi talent could be used as much as possible. "It is so important that the youth of this area develop themselves in science and mathematics for the great future that awaits them here," von Braun said. He also stated the need for qualified minority individuals to fill positions in the technical community at the installation. "There is a strong need to get rid of some old traditions and face the future and its challenge, and the need for men of both the black and white races to develop," von Braun advised. Commenting on the task at hand, Von Braun said the work was "very nearly" on schedule and not delayed "much" by the unusual rains.[22]

Fortune deserved his boss's praise. His efforts to lay a foundation for community support paid off when Mississippi Governor Paul B. Johnson, Lieutenant Governor Carrol Gartin, and members of the state legislature visited the test site. Fortune briefed the group outdoors on the bank of the Pearl River behind the Rouchon House at old Gainesville. Fortune, in his calm and reassuring manner, advised the Governor and the state lawmakers that the test site would have a "dramatic [economic] impact" on the state. The friendly Navy captain was well received by the state government officials.[23]

---

21. "Senator Stennis Pays Visit To MTO Test Site," *Picayune Item*, 14 May 1964; "Dr. von Braun Makes Tour Of Gainesville Site," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 3 May 1964.
22. "Schools Big Need," *The Sea Coast Echo*, 14 May 1964; "Von Braun Pleased With MTO Progress," *Picayune Item*, 14 May 1964.
23. "Lawmakers Wind Up Two Days On Coast Tonight," *The Daily Herald*, 11 April 1964; "Johnson, Gartin, And Solons In Tour Of NASA Operation," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*), 11 April 1964.

Statements by von Braun, Fortune, Stennis, and other notables visiting the site during those formative years; the extensive coverage by the media; and the bustling onsite construction activity gave south Mississippians every reason to believe they were in the midst of a boom of monumental proportions. Indeed, evidence of growth mounted with the arrival of large numbers of new workers searching for places to live. Realtors were especially pleased to meet the NASA, GE, Boeing, and NAA employees because they were known to be part of the permanent party that would be buying expensive homes and investing their taxes and payroll checks in the communities.[24]

Early predictions by von Braun that the NASA space center was the kind of activity Chamber of Commerce people "dream of" seemed to become a reality. A "cover story" in the 20 July 1964 *U.S. News & World Report* entitled "Space Billions—Now a Boom" further stimulated the expansion of towns and cities in the area. The article was reprinted in local newspapers and described the space program as a new industry in the southern states worth "billions." The article also referred to the "Space Crescent" and stated that money for the space facilities was being spent at the rate of "one-million dollars every two hours."[25]

"Whole areas are undergoing drastic alteration in appearance and in their way of life," the article said. "A boom is predicted for three cities near the test ground in Mississippi—Picayune, Bay St. Louis in Mississippi, and Slidell, just over the border in Louisiana." The *U.S. News & World Report* article predicted final cost of the Mississippi facility at $750 million. The only way such a cost could be incurred would have been with the full impact of a Nova-class rocket, which never came to pass. Adding even more high-powered economic fuel, area newspapers followed with editorial comments. The New Orleans *States-Item* carried an editorial headlined "Awesome Space-Age Impact Seen" that elaborated on the *U.S. News & World Report* article and stated, "Merely witnessing the industrial and economic changes will be an exciting adventure."[26]

On the heels of the boost from the national magazine, NASA Administrator James Webb, dynamic leader of the nation's lunar landing program, paid a visit to the test site and requested a "private" meeting with community business

24. Bullock, "Utilization Data," attachment 3, pp. 1–3.

25. "Space Billions—Now A Boom?", *U.S. News & World Report*, 20 July 1964, pp. 24–29.

26. *Ibid.*; "Awesome Space-Age Impact Seen," editorial, *The Times-Picayune*, 25 July 1964.



James E. Webb, NASA administrator (center), talks to Harold Mullins, U.S. Army Corps of Engineers (left), and O.L. "Dusty" Rhodes, NASA, of the Mississippi Test Operations during the early days of construction. (SSC-64-600A)

leaders. At Webb's direction, Fortune's PIO (Herring) and community relations staff hastily invited about 20 businessmen from the Gulf Coast, and they assembled in Captain Fortune's office at the Rouchon House. News reporters were invited, too, but they were held outside until the closed-door session was over. Inside, James Webb charmed his south Mississippi audience. He took off his coat, displaying his red, wide-band suspenders, and he opened the meeting by telling the select group, "I'm just a country businessman from North Carolina. I was surprised when President Kennedy called me up on the telephone and asked me to head up the space program." With the audience relaxed by Webb's "down-home" demeanor, he made himself comfortable by sitting on Captain Fortune's desk, thumbs latched under his red suspenders.[27]

27. "Space Program Beginning," *Picayune Item*, 17 September 1964; Leo Seal, Jr., interview; W. Henry Lambright, *Powering Apollo, James E. Webb Of NASA* (Baltimore, MD: Johns Hopkins University Press, 1995), pp. 1–14.

Webb stressed the importance and magnitude of the test facility to the businessmen, who gave him their undivided attention, expecting to gain "inside information" from the NASA chief. "The entire nation will benefit from the tests here," Webb said. The local businessmen told Webb their "biggest worry" was bridging the gap between the specialized needs of the many new opportunities opening up and the present education and training available in the area. Webb answered by making a promise on behalf of NASA that many of those present never forgot. "We are willing to help and meet any community half-way in providing help to bridge the gap," Webb answered emphatically.[28]

After the executive meeting, Webb told waiting reporters on the porch that the projected MTO payroll would be $20 million when the facility was in full operation. The NASA Administrator cited a survey made of the impacts of the MTO and the Michoud plant, in eastern New Orleans, on the general area. The survey showed 70 new apartment buildings under way, 36 new residential subdivisions started, 1,346 new homes erected, and 176 new businesses started. Webb emphasized that these figures included St. Tammany Parish, Louisiana, which was largely influenced by the huge Michoud plant already employing 11,505 people. Webb stated that "community relations in the area are very good."[29]

Webb's visit provided reassurance to business and community leaders, who were feeling "growing pains" from the impact of more than 2,500 workers crowding their towns. In addition to providing a much-needed cash-flow to the area, one of the many side benefits from the space facility was its first United Fund drive, conducted in 1964. The proceeds from the drive went to the communities on the Gulf Coast and to the Greater New Orleans Area United Fund. As a result, NASA became a leader among coast communities with its charitable donations.[30]

---

28. "On The Moon By 1969, Webb Forecast," *The Times-Picayune*, 15 September 1964.
29. *Ibid.*
30. "Joint Fund Drives At MTO Agreed To," *The Sea Coast Echo*, 10 September 1964.

Some Drawbacks

Not all NASA community influence was rosy for local officials, who had to cope with the massive influx of new people into their towns and cities. For example, Mayor John Scafide of Bay St. Louis told the Long Beach Knights of Columbus Council that his city was experiencing "economic prosperity never before witnessed in this section." He also told the Knights that Bay St. Louis' efforts to improve water and sewage systems and its streets had gotten the city into trouble. The city worked tirelessly from 1961 until 1968 in attempts to wade through a bureaucratic maze, imposed by the Federal Area Redevelopment Administration and the Federal Housing and Home Finance Administration, to obtain grants. After all, NASA was urging communities to "upgrade" to meet the standards required by incoming NASA families.[31]

Harry Gorman, the MSFC deputy director, endorsed the Bay St. Louis "upgrade" with a letter and his representatives urged Mayor Scafide to pursue the project. However, even Senator Stennis failed to move the sluggish bureaucracies in Atlanta and Washington, and Bay St. Louis had 40 miles of torn-up streets, many impassable, for newcomers to view while looking for homes. Needless to say, many chose to live in Picayune, Pass Christian, or Slidell, as Bay St. Louis struggled to pay for its well-intended efforts to upgrade.[32]

Even with the growing pains of Bay St. Louis, the county seat, Hancock County employment doubled to over 8,000 workers between 1960 and 1965. One old industry had some problems with the progress taking place in southwest Mississippi. The making of illegal whiskey was big business in the area around Kiln, Mississippi, on the Jourdan River, and there were stills located in the lands attached to the NASA "fee area and buffer zone." The presence of these stills was not a major concern for NASA officials, as they viewed the moonshiners and their stills as a humorous topic of conversation, rather than a source of legal concern. In turn, the location of the NASA site proved only a passing problem for the moonshiners because they simply moved their stills outside the fenced NASA perimeter.[33]

---

31. "Scafide Tells Test Operation Impact In Area," *Picayune Item*, 8 October 1964; Bullock, "Utilization Data," 1968, attachment 5, pp. 1–3.
32. Bullock, "Utilization Data," 1968, attachment 5, pp. 1–3.
33. *Ibid.*; "Moonshine May Fuel Hancock Rocketships," *The (Jackson, MS) States-Times* (henceforth referred to as *The States-Times*), 2 November 1961.

The effects of the arrival of the NASA boom and the building of new industries could best be seen in the rapid inflation that occurred in Picayune. Seal's Cafe on Canal Street was known for years for its "home cooking" and 5-cent cup of coffee. When the new workers began arriving, a handwritten sign went up in the cafe's front window: "The Boom Is On—COFFEE 10 CENTS."[34]

Leadership Changes

With communities changing before the very eyes of newcomers and natives, the landscape at the construction site was taking on a new look, with towering steel structures rising high above the cypresses, oaks, and pines. And, with these changes, NASA, the Corps of Engineers, and the new contractors began sending in a new team of leaders. Superb leaders were emerging during the Apollo program; many had proven their merit during World War II, the Korean War, and in private industry during the pioneering days of modern rocketry.[35]

Colonel Robert C. Marshall was named as district engineer for the Corps of Engineers in midsummer 1964, replacing Colonel D.A. Raymond. Colonel Marshall directed the Mississippi construction from his offices in Mobile, Alabama. One of Marshall's first appointments was Colonel Roy P. Beatty as area engineer, replacing William R. Coryell, acting area engineer. Colonel David Roberts was deputy district engineer for NASA support. These appointments placed military men in all but one of the Corps of Engineers' key management positions. To that position, Colonel Marshall named Coryell, a civilian, deputy area engineer under Colonel Beatty.[36]

Experienced veterans in the growing aerospace industry joined Captain Fortune in top management positions to activate and operate the test facility. Frequently referred to as the "big four," these managers were Fortune, NASA; William R. Eaton, GE; John J. Cully, Boeing; and Harry C. Cox, NAA.[37]

---

34. "Still Destroyed Near Santa Rosa," *Picayune Item*, 1 October 1964; "The Boom Is On," *Picayune Item*, 1 November 1964.

35. News Release, U.S. Army Corps of Engineers (henceforth referred to as COE), 7 February 1964, SSCHRC; News Release, COE, 2 August 1964, SSCHRC; "Corps of Engineers Has Vital MTO Role," *The Clarion-Ledger*, 1 April 1965; News Release, COE, 2 June 1963, SSCHRC.

36. *Ibid.*

37. *Ibid.*

In 1964, another NASA leader, Gordon Artley, appeared on the scene to help prepare personnel and facilities for the Apollo test program. One of America's pioneers in rocketry, Artley was a favorite of Heimburg and earned a reputation in the Air Force missile program and private industry as a lone-wolf manager who "got things done."[38]

A Turning Point

Artley's arrival and the ending of 1964 marked a turning point in preparing the test facility for the Saturn rocket stages. The Corps issued an earlier warning that "more money and people" would be needed to recover the time lost, due to heavy rains and shortages of critical building materials. In addition, evidence of construction schedule slippages became apparent during late 1964, when fixed-price contracts awarded by the Corps of Engineers were not completed. Coupled with weather conditions and technical problems, it became necessary for NASA to re-evaluate its position and to establish a recovery program to meet the Saturn V schedule requirements for stage acceptance tests.[39]

The Corps of Engineers assembled about 80 leaders, including their own, from NASA, construction contractors, and labor organizations for a one-day "seminar" on 29 November 1964 to "stress the national importance of the lunar landing program." Major General A.C. Welling, of the Corps South Atlantic Division, Mobile District, arranged for von Braun to be keynote speaker at the meeting held in Biloxi, Mississippi. Discussions during the seminar centered around completion of the S-II Test Complex, which would be the only place in the country that the Saturn V second-stage rocket could be tested.[40]

Von Braun stressed the critical nature of the work at hand, noting that, "It will be at the S-II stand now under construction that [the stage] will receive its only full-duration firing before a lunar mission." In a somber voice von Braun pointed out that "If our program slips one year it would

38. Leo Seal, Jr., interview by Henry Dethloff; "Summary Working Papers," *Executive Directors Collection*, SSCHRC; "Big Four For MTO Highly Experienced," *Picayune Item*, 30 April 1964.

39. A.J. "Jack" Rogers, Jr., interview by Mack Herring, Gulfport, MS, 7 April 1995.

40. Gordon Artley, interview by Mack Herring, Merritt Island, FL, August 1995.

cost $1 billion. This kind of money is not available from Congress just for the asking."[41]

At the time of the Biloxi meeting and von Braun's motivational address to the builders, the work population at the test site was slightly more than 2,700 persons, mostly construction personnel. The frantic construction scene, however, began to shift to the next category of work. Because of the magnitude of the building projects, the work was divided into three phases: (1) construction, (2) activation, and (3) operation.[42]

The construction phase overlapped the activation phase in that it integrated construction, equipment installation, checkout, and demonstration readiness testing. NASA critically studied its position in Mississippi as activation work began in earnest during 1964 and early 1965.[43]

An official estimate published by the MTF Working Group in Huntsville placed the S-II second-stage rocket schedule 17 months behind the original contract date. The schedule was designed to have a flight stage on the dock at Kennedy Space Center in time to meet Apollo lunar landing schedules. Artley said his studies actually put the work 22 months behind schedule. The schedule slippage caused alarms to go off all the way to NASA Headquarters, where managers were mindful of the country's commitment, while closely monitoring the Apollo program's progress.[44]

Completion of the S-II-stage test facilities emerged as the "pacing item" in the Apollo program, since there was no other place in the country being prepared to test the new, Saturn V second-stage, liquid hydrogen rocket. The Apollo era decision makers knew the facilities in Mississippi had to be virtually complete in order to test and flight-certify an S-II rocket in time to meet the launch schedules. In other words, the lunar landing program was in jeopardy.[45]

Earlier plans, allowing the Corps of Engineers to proceed with a conventional and orderly construction and then to turn the brick and mortar facilities

---

41. "Significant Problems Encountered," Auter working papers, SSCHRC; "Stresses Test Stand Importance," *The Daily Herald*, 30 November 1964.
42. *Ibid.*
43. "Sequence Of Mississippi Test Facility Development," Auter working papers, SSCHRC.
44. *Ibid.*
45. Roger E. Bilstein, *Stages to Saturn, A Technological History of the Apollo/Saturn V Launch Vehicle* (Washington, DC: National Aeronautics and Space Administration SP-4206, 1980), p. 74; "Mississippi Test Facility Development Plans And Schedules," Auter working papers, SSCHRC.



Construction crews install steel reinforcing rods at the base of what became the A-2 test stand. The excavation for the stand went down some 50 feet with steel H-beams driven approximately 95–100 feet deeper to form a foundation for the huge piers of the test stands. (SSC-64-134C)

over to NASA and its contractors for installation and activation, were no longer possible. Drastic actions had to be initiated. In order to achieve the S-II activation, the navigation lock; canal system; A-2 test stand; and all instrumentation, data, and propellant systems had to be completed.[46]

Artley's Alligators

Von Braun assigned Gordon Artley the task of overseeing the critical activation phase and bringing the test facility on line. He decided to give Artley the job of recovering the lost time. Artley was strongly recommended by Brigadier General Edmund F.L. O'Connor, head of the MFSC's recently organized Industrial Operations; Dr. Herman K. Weidner, Chief, Structures and

46. Artley, interview.

Mechanics Laboratory; and Karl Heimburg, who developed a great trust in Artley's management ability on earlier rocket projects. In addition to Artley's impressive credentials with military missile and rocket projects, he had served as Chief of Test Operations for Heimburg in Huntsville. Artley had also worked for Army Major General Holger N. Toftoy, who was instrumental in bringing the von Braun team to the United States.[47]

Artley spent a few weeks incognito at the Mississippi site evaluating the tremendous task ahead. After he introduced himself in December 1964 to the NASA and contractor crews, he was easily recognized. He dressed in a white shirt with an open collar, cuffs turned up, casual slacks, and black ankle boots. He wore his hardhat everywhere, a part of his "uniform" that added to his special charisma.[48]

Hardhats were required protection for everyone as construction was under way almost everywhere on the 13,500-acre installation. The "Artley look" was soon imitated by his lieutenants and others involved in the activation phase who wanted to be identified with the team.[49]

Artley set about putting together an extraordinary activation team of government and contractor employees to meet the Apollo program test schedules. His first action was to set up activation headquarters in the Rouchon House. Fortune and most of his staff moved into the partially finished three-story Engineering and Administration Building (Bldg. 1100). The GE employees occupied office spaces at the opposite end of Building 1100 from Fortune and his NASA crew. Fortune busied himself with recruiting and organizing an operating staff, while Artley began recruiting experienced personnel.[50]

Artley found that only a handful of engineers and technicians onboard in Mississippi had the specialized experience needed for activation of the test stands. In April 1965, there were over 3,000 workers on the site. GE, the support contractor from which Artley would have to draw most of his help, had 443 employees, with subcontractor personnel numbering 179. NAA, the company that would be testing the Saturn V second stage, had 97 workers, mostly from California, to begin the job of getting ready for the static engine testing.

---

47. *Ibid.*
48. Artley, interview; O.J. Howe, interview by Mack Herring, August 1995.
49. Howe, interview; James Boyland, interview by Mack Herring, August 1995; Charles Swan, interview by Mack Herring, August 1995.
50. Howe, interview; Swan, interview.

In order to recruit workers with activation installation skills, Artley met with contractor managers and insisted they hire employees who could be used immediately. "The contractors brought in 300 new people for our activation team in one month," Artley recalled.[51]

Artley had a following of dedicated missile workers at other sites, and he called on them to join him in Mississippi. Many of his former activation experts were with the Martin Company, a company that gained a tough, no-nonsense reputation for getting the job done for the Air Force. These experts were strongly loyal to the Martin Company, with a reverence for Gordon Artley as their leader.[52]

One of these former activation experts was O.J. Howe, hired by GE at Artley's request and put in charge of Work Control for the entire base, with 19 contractor personnel from the Parsons Company helping him direct the work traffic.[53]

Another activation expert recruited was Tom Flynn, a quiet, capable westerner who helped Artley with other missile projects. Artley said he also depended heavily on Fred Kohl, one of his most valued assistants, who was named head of the activation efforts by GE. Jim Boyland, another missileman, had worked for Artley at a Titan site near Sacramento, California. Boyland answered Artley's summons and came to Mississippi to "straighten out the warehouse mess." Howe, Flynn, Boyland, and Kohl all remained through the activation and operation phase and eventually retired in the Gulf Coast area.[54]

In a further move to strengthen the activation work, the MTF Working Group in Huntsville was disbanded and its capable engineers transferred to Mississippi on "continuing temporary duty." Some of the engineers that transferred were A.J. "Jack" Rogers, Jr., Tom Edwards, Kenneth Riggs, Henry Dyer, W.L. "Willie" Shippey, Summers Taylor, and Colonel Charles Palmer. Having key members of the Working Group on the construction site was especially valuable, since they were instrumental in the design of the facilities and technical systems being installed. For example, as Artley said, "some detailed drawings showed cryogenic pipe connections joining in a certain

51. Artley, interview.
52. *Ibid.*
53. *Ibid.*
54. Howe, interview.

place on the test stand. But when you examined them in the field, they may have ended up a couple of feet apart!" With the Huntsville engineers on the spot, these kind of problems were resolved in minutes, rather than days.[55]

Artley also had the benefit of the detailed test site activation plans developed by Henry Auter. Auter's plans documented what was needed to see the activation phase through to completion. And Artley had Auter present to help guide the work of thousands of personnel, many of whom were the key engineers recruited by Auter.[56]

Artley used a management technique that worked for him on the Titan sites to organize and track the activation work. He called the technique "Complex Operational Group" (COG), and he divided all the work projects into COGs. "I liked the acronym," Artley recalled, "because it spelled cogs, which are what keep a wheel moving." There were six COGs; the S-II complex was COG 1 because of its immediate importance. The other COGs included the S-IC stand, test support, data operations, propellant operations, and waterways. A tried-and-proven management tracking concept, called Performance Evaluation and Review Technique (PERT), was used to keep track of and give visibility to every project on the site. The PERT system employed a master control room, with smaller control rooms located in various COGs. The smaller control rooms electronically tied back to the Building 1100 master control room. All work status was posted daily, and work managers could see at a glance the status of their work and the exact locations of their problems.[57]

According to many who worked for Artley, motivating others was Artley's strongest suit. He held a meeting ("Sunrise Service") every day at 6:30 a.m. and assembled his lead personnel and supervisors to review the work status and determine the next step. Anyone who attended one of Artley's Sunrise Services never forgot his high-pitched "sermons." George Beasley, a NASA engineer from Alabama, once called Artley's attention to an article in the morning newspaper. Gordon Artley said in his high-pitched voice, "George, when do you have time to read the newspaper?" Beasley meekly replied, "Early in the morning, Gordon, on the way to work." Gordon retorted,

55. Artley, interview; Boyland, interview; Howe, interview.
56. Artley, interview.
57. *Ibid.*

"George, that means you are getting up too late because you must have sunlight to read the newspaper; you should be out here at work when the sun comes up!" Beasley would have felt "left out" if he were not included in one of the famous "chewings" by his flamboyant leader.[58]

Artley employed positive motivation techniques through development of a bona fide mascot to help boost employee morale. He met with well-known site artist Charles Swan and outlined his need for a motivational symbol. Artley and Swan talked about both the armadillo and the infamous alligator, a ferocious reptile that abounded in the rivers and swamps around the NASA site. Artley said, "The armadillo is too harmless, we need something strong and powerful like the alligator." Swan drew a cartoon of an alligator that became the symbol of the activation team. As one of Artley's motivational awards, the activator of the month won the "Alligator Award" certificate, which entitled the recipient to a free trip to Huntsville to witness a static firing. The fired-up "Alligators" worked day and night and went to all lengths to win the simple certificate and a trip to Huntsville. Later, Henry Auter revived the Alligator Award and presented it to those retiring from the test facility. The Artley-inspired, Swan-original cartoon is still held dear in the hearts of the oldtimers who remember the Artley era.[59]

---

58. *Ibid.*; Jones, "Brief History Of Mississippi Test Facility," pp. 23–24.
59. Howe, interview; Boyland, interview; Swan, interview.

CHAPTER 6

Testing Saturn

A New Task Force

The final push toward readiness for static-testing the big Saturn V rocket stages was well under way in early 1965. New leaders and thousands of additional helpers arrived to rush the lunar landing project through its Mississippi way station. Long before the last booster rocket's red glare was seen, the new space complex began changing direction. This change was led by innovative NASA test site manager Jackson Balch, who teamed with concerned politicians to take drastic steps to save the testing installation from oblivion in the Hancock County swamp.[1]

Shifting Into High Gear

The schedule slippages in both the Mississippi test site construction phase and the manufacturing of the Saturn V second stage (S-II) at Seal

1. Maria Watson, "Balch Recalls Progress At Hancock Test Facility Site," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 24 July 1975; "Ellender Proposes Science Setup To Operate At NASA Mississippi Test Facility," *Picayune (MS) Item* (henceforth referred to as *Picayune Item*), 2 April 1970.

Beach, California, caused von Braun, his Marshall Space Flight Center (MSFC) engineers, and NASA Headquarters managers to reassess the entire S-II test program.[2]

The reassessment began in December 1964 and continued until February 1965. After a three-month review, von Braun recommended to Major General Sam Phillips, director of the Apollo program, the reworking of the S-II test program plans to make up for some of the slippages. Phillips then set into motion a series of shortcuts designed to get the S-II program back on track. These shortcuts caused significant changes at the Mississippi facility, including transfer of the All-Systems Test Stage (S-II-T) with its Ground Support Equipment (GSE) from Seal Beach to the facility.[3]

In order to slingshot the test facility into operation, the MSFC decided to accelerate the entire program in Mississippi. Marion Kent was sent down from the MSFC by von Braun to inform the local residents of the NASA change of plans. A well-known and respected administrator, Kent advised local community leaders of an increase in new personnel as the test site moved into a "new phase of operation." Captain Fortune invited community leaders from Picayune, Bay St. Louis, Waveland, Pass Christian, Long Beach, and Gulfport, Mississippi, and from Slidell, Louisiana, and members of the local media to a meeting in the unfinished Engineering and Administration Building (Bldg. 1100).[4]

Rumors that a big acceleration was in the making increased interest in and attendance at the community meeting. A few days before, NASA held a "technical meeting" to review the S-II situation and get "their ducks in a row." Eberhard Rees, Karl Heimburg, Captain Fortune, and other MSFC officials were present at the technical meeting, as were some 90 persons representing GE, North American Aviation (NAA), Boeing, the Corps of Engineers, and several subcontractors.[5]

---

2. Leo L. Jones, "A Brief History of the Mississippi Test Facility, 1961–1966, comment draft (Huntsville, AL: MSFC History Department, 1967), pp. 48–50, Stennis Space Center Historical Records Collection at Stennis Space Center, MS (henceforth referred to as SSCHRC); See also Roger E. Bilstein's *Stages To Saturn, A Technological History of the Apollo/Saturn Launch Vehicles*, for excellent discussion of technical development of the S-II and S-IC rocket stages and management interchanges between NAA and MSFC officials. For specific references to this part, see "Crisis At Seal Beach," pp. 222–233.

3. NASA News Release, 8 April 1965, SSCHRC; "Coast Towns Near Test Site Experiencing Booms," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*).

4. "Mississippi Test Facility Development Plans And Schedules," Auter Working Papers, unnumbered, SSCHRC; "It's Go, Go, Go At MTO," *Picayune Item*, 15 April 1965; NASA News Release, 8 April 1965, pp. 1–2, SSCHRC.

5. "Coast Groups Invited To Test Site For Report," *The Daily Herald*, 5 April 1965.

The scheduled community meeting and national headlines about Soviet successes no doubt fueled the rumor mills. The day before the community meeting, Charlie Nutter, editor of the *Picayune (Mississippi) Item*, ran a page one story with a headline that read "It's Go, Go, Go At MTO!" The story stated that the lunar landing program was suddenly shifted into "very high gear." Nutter concluded that the "go button" had been mashed down hard and that "all systems [were] go from Washington to Devil's Swamp in Mississippi."[6]

Actually, the acceleration was the result of months of investigation by von Braun's MSFC group and NASA Headquarters managers. Certainly, the long-range objective was to beat the Soviets to the Moon, but the recent Soviet progress was not the reason for the rush to get the Mississippi site into operation. Instead, the immediate rush was an attempt to get the lunar landing program back on schedule. The community leaders anticipated the meeting with great apprehension, because they were already experiencing a boom of immense proportions, with 40 new permanent families arriving every day. The possibility of an even greater population acceleration was a matter of deep concern.[7]

Captain Fortune's community meeting at the bustling test facility was intended to announce one of the fastest community expansions in the country, similar to those experienced in and around cities housing defense plants during World War II. At the last minute, however, NASA Headquarters had not completed its review of the new MSFC activation plan that outlined when the influx of new personnel would begin arriving. The community meeting went ahead as planned, with Kent and Captain Fortune "winging it" with the data they had.[8]

Most of the community leaders and local media came to the meeting believing they would learn reliable details of the rumored acceleration timetable. Some even anticipated that new programs beyond Apollo, such as "Nova," might be announced by Kent. An accomplished speaker with a pleasing personality, Kent acknowledged that plans were not quite complete, and

---

6. *Ibid.*

7. "MTO Official Predicts Hike In Personnel," *The Hancock County (MS) Eagle*, 22 April 1965; "Alert Given For Big Upward Push At Mississippi Test Site," *The Slidell (LA) Times*, 22 April 1965.

8. "Speed-Up," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*), 22 April 1965; "Step-Up In MTO Personnel Seen To Close Schedule Gap," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 17 April 1965.

the "numbers" would be announced in a "couple of weeks, around May 1." He indicated that the number of permanent personnel would be increased, with additional personnel brought in to speed up the testing program.[9]

Kent spent his time at the meeting showing community growth charts, presenting results of his impact area studies, and making personal observations on community needs. At the time of the meeting (17 April 1965), the test facility personnel count was 3,480. Before the meeting was adjourned, Captain Fortune showed slides depicting the $100 million construction that was under way and said that he wanted to "dispel rumors in the communities about further land acquisitions." He stated that the government paid more than $16 million for purchase of the fee area land and the buffer zone easement, a figure higher than had been anticipated. In fact, the total land acquisition cost was $21.5 million. Area residents continued to remain sensitive about additional lands that NASA might seek to meet the needs of an accelerated program.[10]

NASA announced on 6 May 1965 the initiation of an accelerated program for testing the S-II rocket. The readiness of the Mississippi facility, and, specifically, the first of the two S-II test stands (A-2), was considered by NASA a "pacing item" for the entire Apollo/Saturn V program. The new employment projections were also announced. Fifteen-hundred new engineers and technicians would arrive for work at the facility within two months, placing the total population at 5,501 by 1 July 1965—a 37 percent increase in personnel. NASA also stated that it was reorganizing several groups at the MSFC that were involved with planning, construction, and general activation of the Mississippi site. With this reorganization, however, there came an unexpected, major shakeup in the management of the developing installation.[11]

NASA was careful in its news release not to highlight the significant slippages that led to a newly developed management program. Rather, NASA emphasized that the Mississippi facility had "[entered] the final phase of preparation" and thought that an increase in the number of persons working at the site "[would] result mainly from the movement into the area of a greater

9. NASA News Release, 6 May 1965, SSCHRC.

10. *Ibid.*; "Manpower/Population Trend (1963–1991)," February 1991, SSCHRC; "MSFC-MTF Personnel Strength," Management Support Office, 27 December 1965, SSCHRC.

11. NASA News Release, 6 May 1965, SSCHRC; See also Bilstein, *Stages To Saturn*, for discussion of the MSFC's Industrial Operations Division, p. 269.

number of employees who [were to] install equipment and operate the facility." The new employees were called "Activation and Operation (A&O)" personnel. NASA referred to those engaged in work generally carried out by the Corps as "Construction and Installation (C&I)" personnel. For a time, both types of workers would be employed at the site.[12]

The increase in personnel was overwhelming to the weary onsite NASA team that had to plan and provide additional workspace, "roads and commodes," and administrative support. To say the least, community leaders were in a state of shock when they heard they must prepare for hundreds of additional "permanent" residents coming to their communities. However, NASA did promise some relief. Their projections suggested that the A&O and C&I workloads would hit their peaks by 30 December 1965. Then there would be a steady drop of C&I employees after that, until the base stabilized with 3,165 A&O personnel by 30 June 1967. By that date, the S-II and S-IC rocket testing would be routine. NASA's projection proved to be extremely accurate. The total site population hit its peak a bit earlier than predicted, with 6,114 workers on site in August 1965 and 4,701 actual workers onsite in December 1965.[13]

NASA announced that Fortune would continue as manager of the Mississippi Test Operations (MTO), "pending organizational arrangements" necessary to carry out the increased scope of activation and operations. NASA also assigned Jackson Balch, assistant to the MSFC assistant deputy director, (technical) to the MSFC Industrial Operations organization and gave him the dual titles of MTO Site Manager and head of the MTO Task Force.[14]

However, on 10 June 1965, von Braun announced that Fortune had been assigned the task of "[evaluating] modes of cooperation between the main elements of the government-industry Saturn rocket team." Von Braun said, "Captain Fortune's task in Mississippi has been rewarding and challenging. His new mission, to point out areas where the cooperation within the successful government team can be made even more effective for future uses of our Saturn super-rocket, is equally as challenging."[15]

Von Braun was accurate in his assessment of Fortune, but perhaps Fortune's greatest contribution came as an excellent good will ambassador for

12. *Ibid.*
13. *Ibid.*
14. "MTF Chief Awarded New Appointment," *The Daily Herald*, 10 June 1965.
15. *Ibid.*

NASA during the MTO's formative years in Mississippi. The gentleman captain made many lasting relationships with leaders on the Gulf Coast, with the state government at Jackson, Mississippi, and with the important Mississippi congressional delegation. Jackson Balch said on one occasion that Fortune was charged with developing good community relations in the area, and "he did just that for a period of three years."[16]

The Balch Era Begins

The appointment of Jackson Balch as NASA's MTO site manager and head of the new MTO Task Force ushered in a unique era in NASA's bureaucratic history. Balch's tenure was one of great triumphs and grim tragedies, described by his closest associates as "the best of times. . . the worst of times." From the testing of giant Saturn rocket stages that sent Americans to the Moon, Balch led men and women on a 10-year quest to accomplish an "impossible dream" by creating a crossroads of science that became respected across the country and as far away as the Soviet Union.[17]

Before Balch retired, as many as 18 federal and state scientific agencies were sharing ideas, projects, and laboratories at the testing facility. These agencies were engaged in exploration of sciences dealing with space, oceans, and the Earth. Governmental, political, and scientific leaders came to study and participate in the new-wave research and development facility on the Mississippi Gulf Coast. Before the multiagency installation could be born, Balch and his staff resorted to extraordinary measures. They enlisted the aid of Senator Stennis and other powerful politicians, community leaders, and members of the press to help accomplish their goal of a multiagency installation.[18]

Balch, born in Yarmouth, Nova Scotia, Canada, the son of a prominent educator and diplomat, was invariably seen at the Mississippi site wearing one of his favorite, conservative, multicolored school ties. Balch grew up and

---

16. Leo W. Seal, Jr., interview by Henry C. Dethloff, Gulfport, MS, 23 July 1991; Leo Seal, Jr., interview by Mack Herring, Gulfport, MS, 27 September 1994; Roy Baxter, Jr., interview by Mack Herring, Pearlington, MS, 5 January 1995; Maria Watson, "Balch Recalls Progress At Hancock Test Facility," *The Daily Herald*, 24 July 1975.

17. Watson, "Balch Recalls Progress," 24 July 1975.

18. NASA-MSFC Public Affairs, "Balch Biography," ud.; NASA-NSTL "Balch Biography," SSCHRC.



Jackson M. Balch, a native of Huntsville, AL, and assistant to Dr. Wernher von Braun, was named manager of the Mississippi Test Operations in 1965. Known as the architect of the SSC multiagency concept, Balch served as manager/director until 1975. (SSC Portrait File-97-030)

was educated in several foreign countries, giving him an international flair in his mannerisms and his thought processes. He received a bachelor of arts degree with a major in civil engineering from Trinity College in Dublin, Ireland. He was very proud of his undergraduate degree and said Trinity provided him access to a "liberal education" with an emphasis in engineering. He then received a master of arts degree from the University of North Carolina and completed graduate studies in industrial engineering at the Massachusetts Institute of Technology. Most NASA managers of his era held degrees in engineering, with a smaller number having majors in the various sciences. Few, however, had as broad (liberal) an education as Balch.[19]

Balch was well-prepared for the formidable task as MTO manager. He had served as an aide-de-camp to General Douglas McArthur near the end of World War II. At the time von Braun named him to the post in Mississippi, he was a colonel in the Alabama National Guard and a Commanding Officer of the 142nd Signal Group in Huntsville. He was proud of his military education, especially his studies at the War College at Maxwell Air Force Base in Montgomery, Alabama. Balch said he learned a great deal about "intelligence" work at Maxwell.[20]

---

19. *Ibid.*
20. *Ibid.*

Roy Estess, one of Balch's most trusted staff members who later became director of the Mississippi facility, described Balch as a "strategic thinker and a tactician." Estess, in offering an excellent description of Balch's management style, states that "while he was an engineer, he didn't think that way. As he was fighting the war to save this place, he would set up dominoes all over the room, one at a time. And you [would] look out there and say, 'Why is he doing that. That domino makes no sense out there. It's not connected anywhere.' And we'd go along for six or eight months and we'd see him set [up] these things, and all of a sudden one day he'd push them over, and every one of them would fall down." Further evidence of Balch's military approach can be found in the fact that he heavily relied on Major General John Medaris, one of his military mentors, whom he asked to serve as a management consultant on several occasions.[21]

In addition to Balch's cosmopolitan education and his military background, he gained invaluable experience serving in top management positions with the Army and with NASA at Huntsville. Balch served under Medaris as deputy chief of the Research Projects Office at the Army Ordnance Missile Command. He joined NASA as an assistant to Heimburg in MSFC's Test Division and was appointed assistant deputy director, Technical Division, under von Braun.[22]

Balch moved his wife Janet and their six children from Huntsville to an antebellum home overlooking the Gulf of Mexico in historic Pass Christian, Mississippi. This move represented a big step for Balch and his family. As a result, he brought a new, determined commitment to the MTO that was destined to play a significant role in the direction and history of the Mississippi space center.[23]

The need to ready the Mississippi facility for Apollo testing was so crucial to America's lunar landing program, NASA pulled out all stops and authorized von Braun to temporarily send his finest personnel to Mississippi as part of the new MTO Task Force. This included the chiefs and directors of contracts, legal, labor relations, communications, administration, facilities, and

---

21. Roy Estess, interview by Henry L. Dethloff, Mississippi Oral History Program of the University of Southern Mississippi, vol. 444, 18 June 1991, SSCHRC; Roy Estess, interview by Mack Herring and Ms. Myron Webb, SSC, 7 July 1995, on audio tape awaiting transcription, SSCHRC.

22. NASA-MSFC Biography.

23. NASA-MSFC Biography.

technical support. Heimburg, Tessman, and a host of other key MSFC personnel joined the Task Force for extended temporary duty at the Mississippi site. Von Braun took these steps to strengthen the Task Force for three primary reasons: (1) to put complete decision-making ability on site, thus stopping all conflicts in the chain of command; (2) to provide Balch with the very best advice that the MSFC had to offer; and (3) to expedite formation of a strong organization to complete construction of the site and monitor testing of the Saturn rockets.[24]

Unique MTF Organization Created

At the same time, activation phase manager Gordon Artley, who accomplished similar tasks for the Air Force, continued to move out with his organization, using innovative techniques in contracting and budgeting to bring in the hundreds of new personnel needed by the support and stage contractors—GE, NAA, and Boeing—to complete installation and activation of the test stands and to begin testing the S-II and S-IC Saturn rocket stages. In the new organization, Artley was named assistant to the manager for activation, but, for all practical purposes, Artley was "in charge" of the activation phase. The first charter, developed in 1965, stated that Artley was to "[activate] the Mississippi Test Facility within approved policies and management decision of the manager." Balch, in conjunction with the MTO Task Force and General O'Connor, the MSFC Head of Industrial Operations, and with von Braun's constant attention, directed most of his efforts into structuring an operational organization.[25]

Balch told historian Roger Bilstein that during the activation phase, the construction and testing activities merged to the point that the first test firings were conducted while construction was still under way. At the time, Balch observed that "we're sure this is the only way to do it, but for the next year we'll be riding with one foot on each of two galloping horses."[26]

---

24. "Balch Meets Press," *The Sea Coast Echo*, 12 August 1965.
25. Leo L. Jones, "A Brief History Of The Mississippi Test Facility, 1961–1966," comment draft, 24 March 1967, MSFC History Office; Wernher von Braun, "Charter Mississippi Test Facility, Industrial Operations," MSFC Management Manual, 27 October 1965, SSCHRC.
26. Bilstein, *Stages To Saturn*, p. 74.

The onsite Task Force corrected a small, but annoying, administrative matter when it announced, 6 June 1965, that the MSFC's MTO would be known in the future as the MSFC Mississippi Test Facility (MTF). This, apparently, was a victory over proponents of the MTO designation. The confusion over the names had been such that the local newspaper ran a humorous story commenting about the bureaucratic haggling over the site's name. The story said, "NASA's MTO now should be known as NASA's MSFC MTF, but don't fret, it's still in Hancock County at Gainesville." The MSFC announcement of the official name change also included a name change for the Michoud plant, changing it to the Michoud Assembly Facility (MAF) to make the sister components compatible in name, as well as organizational channels. However, many other changes of greater significance were in the making with the new onsite Task Force deeply engaged in its mission.[27]

As the Corps turned over more facilities to Artley's activation team, the installation and checkout of the technical systems needed for testing the Saturn rocket stages increased the team's workload. Hundreds of engineers and technicians began arriving to swell the MTF workforce. In June 1965, NASA announced that 4,619 workers were on site, a number that was "on schedule" with the projections made in the 6 May 1965 announcement. A breakdown of personnel figures showed GE, most involved with activation work, with 1,146 employees. NAA, with more S-II test team members on site, had 333 people. NASA, with Balch and his onsite Task Force, had 84 civil service workers on its permanent employee list.[28]

The activation and operation personnel came in so fast that NASA simply had no place for them. The buildings on the site were being rapidly completed, but the large numbers of personnel were not expected when NASA planned its administrative and laboratory space. As it turned out, this dilemma for NASA proved to be a plus for the business sections of at least three nearby communities. GE leased a garment plant in Picayune and placed 450 management and clerical workers in the 50,000-square-foot facility.

27. NASA-MTF News Release, 1 July 1965, SSCHRC; "Name for Static Testing Site About As Long As Trip To The Moon," *The Daily Herald*, 15 June 1965. The name "Mississippi Test Facility" would continue until the installation was renamed the "NASA National Space Technology Laboratories," and given full field installation status on 14 June 1974. The "Mississippi Test Operations" name was dropped for good on 1 July 1965, eliminating a great deal of administrative confusion.

28. "Picayune Continues To Lead As Preference For MTO Employees," *Picayune Item*, 15 June 1965; "Projected Personnel Count Met At MTF," *The Sea Coast Echo*, 24 June 1965.

Across the Pearl River in Slidell, Louisiana, NAA rented two floors of a new office building and located 80 employees there. Special cleaning of the cryogenic valves was done in a warehouse in Gulfport until space became available at the site.[29]

Anatomy Of A Rocket Team

The new employees formed an unusual team, with members coming from all walks of life and all parts of the country. The NASA employees were largely from the Deep South and the majority of personnel in the NASA-MTF group had roots in Mississippi and returned to their home state when given the opportunity. Many had been employed at the MSFC in Huntsville, and they kept their eyes on the Mississippi project when it first materialized.[30]

GE brought together technical and managerial personnel from such areas as Lynn, Massachusetts, and Valley Forge, Pennsylvania. NAA imported most of its test people from their West Coast aerospace complex near Los Angeles. Many of these employees were reluctant to leave their California lifestyle and had to be lured to Mississippi with special bonuses referred to as "Swamp Pay." Boeing brought engineers from the Seattle, Washington, vicinity. These personnel were joined by numerous local hires from Louisiana and Mississippi. Senator Stennis insisted that local people be hired for as many jobs as possible. When this diverse crew began working together, a professional respect for each other developed and helped forge an unusual and highly effective space team.[31]

The small NASA civil service management group that directed the hybrid government-contractor team was never expected to become a large organization similar to the MSFC, the Johnson Space Center, or the Kennedy Space Center, but an "extension" of the MSFC Test Division, with support from various offices and laboratories in Huntsville. Heimburg never wanted another test organization to compete with the MSFC. In addition, NASA was pleased

---

29. "GE Moves One Group To Picayune Plant," *Picayune Item*, 17 June 1965; "MTF Opens New Opportunities For State Education, Youth," *Picayune Item*, 17 June 1965.
30. Harry H. Gorman to John C. Stennis, "Background and Economic Impact Of The NASA Mississippi Test Facility," ud., SSCHRC.
31. Gilda Perkins, "Swamp Pay Lured Workers," *The Slidell (LA) Times*, 27 April 1975.

to tell the Congress that, nationally, the Space Agency did "about 90 percent" of its business with private industry.[32]

The function of the NASA-MTF group was officially stated in a new charter developed by Balch and the MSFC Task Force and signed by von Braun. The charter placed the MTF directly under O'Connor's MSFC Industrial Operations organization. The charter stated that the purpose of the MTF was to "organize, manage, and coordinate MSFC responsibility at the Mississippi Test Facility in the management and direction of stage and support contractors' performance of assignment, developmental, and acceptance testing, checkout, refurbishment, and service support programs." The directions contained in the charter clearly placed the management of the MTF under Balch and his new NASA-MTF organization. Furthermore, the document gave the MTF control of "the complete activation of the site to include its initial integrated operations."[33]

Balch went to the chalkboard on numerous occasions to brief official visitors on his version of the MTF management concept. He lectured that "We have provided a government-owned, contractor-operated place [the MTF] for the stage contractors [NAA and Boeing] to bring their product and demonstrate it to NASA, according to strict, government contract specifications. The General Electric Company, our stage contractor, furnishes technical and base support and gathers the data. NASA monitors these tests, analyzes the data, and issues flight worthiness certificates if the stage performs according to its contract specifications. It is at this point that NASA, on behalf of the government, accepts the product. This is why we call what we do acceptance testing."[34]

In addition to NASA and its support and stage contractors, there were 30 prime- and 250 sub-contractor companies during the summer of 1965 getting ready for the first test. On the critical A-2 test stand, where the S-II rocket was to be tested, there were 20 different companies engaged in a variety of work.[35]

The workers, toiling both day and night on the construction and activation of the facility, were not the only personnel with a keen interest in timely completion of the MTF. NASA Administrator Webb brought his advisory

---

32. Karl Heimburg, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 399, 6 March 1992, pp. 15–16, SSCHRC.
33. Von Braun, "Charter Mississippi Test Facility."
34. Jackson Balch, audio tape, 6 June 1967, SSCHRC.
35. NASA-MTF News Release, 19 June 1965, SSCHRC.

consultants to view the progress; with the group of aerospace giants was national space hero, Colonel John Glenn—the first American to orbit the Earth on 20 February 1962. Others in the Webb group were Dr. Arthur Raymond, Rand Corp.; General Charles P. Cabell, United States Air Force; Dr. C. Stark Draper, head of the aeronautics and astronautics department, Massachusetts Institute of Technology (MIT); General James McCormack, vice-president, MIT; John D. Young, deputy associate administrator, NASA Headquarters Administration; Brian Duff, public affairs office, NASA Headquarters; Harry Gorman, deputy director, MSFC Administration; and Bart J. Slattery, Jr., director of Public Affairs, MSFC. Others who joined the important visitors were Dr. George Mueller, associate administrator for the Office of Manned Space Flight (OMSF); von Braun; and General O'Connor.[36]

As the prestigious group was about to walk out to an open area atop the 300-foot-tall S-IC test stand, a typical coastal thunderstorm produced a shower of lightning bolts all around the structure. The ominous display from the heavens prompted von Braun to quip, "Maybe we shouldn't all go out together with all this lightning around—the leadership of America's space program is up here!"[37]

The focus of the space flight program was on the work frantically under way at the MTF. The pressure was felt by the workers, as well as the managers, as they pushed on toward the first rocket test to prove the site's operational status. In missile program terminology, the first static engine test was referred to as the "long pole" or the principal structure supporting the schedule for the lunar landing program.[38]

Hardware Arrives, Countdown Starts

NASA-MTF Manager Jackson Balch went public in a press conference on 10 August 1965 and set 2 January 1966 as the date for the first static firing of a Saturn rocket stage at the site. Balch qualified the date of the first firing

---

36. NASA-MTF News Release, 5 August 1965, SSCHRC; NASA-MTF News Release, 26 August 1965, SSCHRC.
37. Von Braun related the humorous quip to the author as the group was about to walk out into the open atop the S-IC test stand on 10 August 1965.
38. I. Jerry Hlass, "Way Station To Space," video, 25 October 1991, SSCHRC.

by calling the feat a "hair-raiser." Artley took advantage of a target date for the test-firing and placed "countdown clocks" (signs that were changed daily) all over the site as constant reminders of his activation team's task.[39]

The arrival of the first "space hardware" on 28 June 1965 was another stimulus for the workers rallying toward the first test. The hardware was built by NAA at the NASA Seal Beach, California, plant; it came in the form of a curious-looking, huge steel spool called the S-II simulator, or "fit-up fixture." The simulator had the same dimensions, weight, and attachment fittings as a "real" S-II rocket stage. For use to check out the test stand operational capability, it would also be used for a dress rehearsal by the workers to prepare for the Saturn rocket test-stage arrival. Indeed, the simulator's arrival by barge was the first use of the huge navigation lock, and it proved the feasibility of the 7.5-mile canal system. The NASA "Navy" personnel operating the marine systems—tugs, propellant and stage barges, lock, and canal—proved they had the expertise they needed.[40]

Two setbacks from the "school of hard knocks" occurred in the late summer and fall of 1965—Hurricane Betsy slammed into the Mississippi-Louisiana Gulf Coast on 10 September 1965, and a fixed crane on the A-2 test stand was ripped off during a load test, even before the S-II simulator could be mounted for checkout.[41]

Hurricane Betsy caused major damage and killed 76 people. Although the MTF escaped the wrath of the storm, 100-mile-per-hour winds scattered any construction equipment not tied down. The MTF was used as a shelter by some 350 Hancock County residents who found their NASA hosts accommodating and the strongly built facilities a safe haven from the hurricane. The NASA-MTF became a valued member of the Gulf Coast Civil Defense Team with its availability of communications and heavy emergency equipment.[42]

Shortly after Hurricane Betsy blew inland, leaving destruction, death, and debris in her wake, the first Saturn stage rocket arrived. The NAA all-systems,

---

39. "Balch Hints At Great Growth In Test Facility General Area," *The Sea Coast Echo,* 12 August 1965; Don Brown, "A Giant Stirs To Life," *The Birmingham (AL) News* (henceforth referred to as *The Birmingham News*)," 8 August 1965; "Saturn Test Stand A-2," photo, *The Birmingham News*, 8 August 1965.

40. NASA-MTF News Release, 28 June 1965, SSCHRC; *Missiles And Rockets*, vol. 7, Washington, DC, 12 July 1965, p. 24, SSCHRC; "Space Hardware Arrives at MTF," *The Marshall (Huntsville, AL) Star* (henceforth referred to as *The Marshall Star*), vol. 6, no. 7, July 1965.

41. "Damage Reported Slight At MTF," *The Sea Coast Echo*, 23 September 1965.

42. NASA-MTF News Release, 17 October 1965, SSCHRC.

second-stage test vehicle, the S-II-T, arrived on site 17 October 1965 after a 4,000-mile, 14-day ocean voyage from Seal Beach, California. The "T-Bird," as the test team called the stage, was the largest liquid hydrogen rocket ever built. The big barrel-looking Saturn V second stage was 81.5 feet long and 33 feet in diameter. The test stage simulated the real rocket in every respect and was built to prove the design and integrity of the rocket under maximum static test conditions. Another mission for the S-II-T was to check out the A-2 test stand and its supporting technical systems.[43]

A harbinger of hard times ahead for the NASA-contractor team involved the S-II-T when it was placed on the dock at the MTF for the first inspection. The rocket was rotated in its towing carriage as part of a rudimentary preliminary test. Workmen standing around could hear "clanks and clinks" as foreign objects sealed within the rocket stage were loosely tossed about. When the stage was opened and inspected, over 400 foreign objects were found, sealed inside at the manufacturing plant. This discovery signaled additional work ahead before the rocket stage could be tested.[44]

The jet-powered tugboat, the *Clermont*, was completed just in time to push the S-II-T the two miles from the stage storage and checkout dock to the A-2 test stand. Designed at the MSFC Test Laboratory and built for NASA at Southern Shipbuilding Corporation in Slidell, Louisiana, the tug was 69 feet long and provided a steady push for its expensive cargoes with a 1,000-horsepower turbine engine weighing only 450 pounds. The unique tugboat was also designed to serve as a fireboat for the test stands, propellant barges, and storage tanks. The *Clermont* was named after Robert Fulton's first successful steamboat built 200 years earlier.[45]

Test Managers

With the S-II-T safely installed in the test stand, NASA began recruiting key personnel to direct the testing of the Saturn V stages and to be MTF managers. On 4 November 1965, Balch announced six key appointments to his

43. Baggette, interview by Herring.
44. *Ibid.*
45. NASA-MTF News Release, 21 October 1965, SSCHRC; NASA-MTF Press Release, 3 January 1965, SSCHRC; "Tugboat In Service At Test Site," *The Daily Herald*, 21 October 1965.

newly organized NASA-MTF group. Henry Auter, who had already gained Balch's confidence as a "strong right arm," was to continue serving as the NASA-MTF deputy manager; and he would be in charge of the Projects Control Office.[46]

Another appointment in Balch's NASA-MTF group, Lieutenant Colonel Frederick A. Frech, was appointed assistant manager for construction and activation. A graduate of West Point and Harvard, Frech served as area engineer for the Army Corps of Engineers at Arnold Engineering Development Center, Tullahoma, Tennessee. Waldo H. Dearing brought an impressive Army management background as credentials to head up the NASA-MTF Management Support Office. Two engineers familiar with the MTF were selected to direct the Mississippi rocket-testing project offices, Robert A. Bush and Myron L. Myers. Bush was the S-II facilities manager in Huntsville, and Myers was the S-IC facilities manager at the MSFC. Both men guided the testing at the MTF through many difficult moments during the Saturn V testing years.[47]

Roy Estess was another engineer who joined the Balch organization during the winter months before the first static-firing test. Estess, a native Mississippian from Tylertown, was working for the Air Force at Warner Robbins Air Force Base in Georgia. Glade Woods, a college acquaintance, announced that he was going to work for NASA at the MTF and suggested that Estess, too, should "take a look." As an enticement to recruit Estess, Woods volunteered that NASA was "going to the Moon." The excitement of the lunar voyage was intriguing during the Apollo era and served as a recruiting tool for numerous engineers and technicians who joined the group.[48]

Estess visited the site and talked to Robert "Bob" Bush, Myrl Sanders, and Doug Howard. Estess then volunteered with two other Air Force employees, John Ivey and James Coward, to take "transfers" to join the MTF quality engineering organization. Furthermore, James Taylor, a former Air Force employee working for GE, also went to work for NASA in quality engineering.[49]

---

46. NASA-MTF News Release, 4 November 1965, SSCHRC. Henry Auter was included in Balch's personnel announcement, although Auter had worked with the facility since its inception.; NASA News Release, 4 November 1965, SSCHRC.

47. *Ibid.*; Robert "Bob" Bush had the difficult task of serving as S-II stage program manager at the MTF dealing with the technical and administrative problems that arose during the test period.

48. Estess, interview by Dethloff; E.G. "Glade" Woods, interview by Charles Bolton, Mississippi Oral History Program of the University of Southern Mississippi, vol. 435, 1 December 1992, p. 5, SSCHRC.

49. Estess, interview by Dethloff.

These NASA-MTF engineers worked in the Saturn V test complex, right beside their contractor colleagues on the test stands and in the blockhouses. The intimate working relationships forged between the NASA and contractor employees during the "get it up and get going" Saturn testing days promoted development of close-knit allegiances. Engineers and technicians not only worked together, they also shared concerns and participated in social endeavors in their communities. Because of the MTF's remote location, a large number of workers commuted together in carpools, and the hours on the road were often spent discussing problems from work. These informal dialogues promoted individual respect and mutual understanding.[50]

Such close government-contractor relationships did not exist at the larger space flight centers where large civil service staffs controlled and directed contractor work. William Eaton, the MTF GE manager, once observed, "We are all focused on the Moon—we can look up and see it. The Moon is a tangible object for everyone to rally around." These relationships improved with the adverse circumstances the team experienced while preparing for and testing the Saturn stages.[51]

This egalitarian organization helped expedite the work and solve many technical problems that arose before the first S-II-T static test. However, relationships at top management levels were not always genial. Beyond the slippages and schedule changes affecting the S-II program, the MSFC believed technical and managerial problems were festering at NAA Headquarters and at the manufacturing plant at Seal Beach. True, the S-II presented major challenges: reduction of stage weight, new welding techniques, and solving persistent problems associated with the insulation of the stage's liquid hydrogen tank. These problems, according to top MSFC management, were on a collision course leading right to the A-2 test stand. Von Braun, obviously deeply concerned, extracted promises from NAA President J.L. Atwood to make major managerial changes at the highest levels of his company.[52]

The tenacious General O'Connor did not end his crusade to correct the S-II situation by simply alerting his MSFC bosses. He elevated the problem

---

50. Woods, interview, p. 5.
51. Bilstein, *Stages To Saturn*, pp. 222–225.
52. *Ibid.*, p. 227.

to NASA Headquarters where a special "Tiger Team" was assembled and sent to investigate. General Sam Phillips, Apollo program director, headed the team. The ad hoc committee findings resulted in a thorough, but searing, document that became widely known as the "Phillips Report." The weighty document contained serious criticisms of NAA's performance in a wide range of areas, including management, contracting, engineering, manufacturing, and reliability-quality control. The document also contained earlier investigations by Colonel Sam Yarchin, S-II program manager.[53]

Eberhard Rees, the MSFC deputy director, apparently even more alarmed by the crisis at Seal Beach, prepared to take drastic steps to correct the S-II problem. He wrote a blistering 13-page memorandum on 8 December 1965 that stated, "the first manned lunar landing may slip out of this decade, considering, for instance, the present status of the S-II program." In an additional seven-page memo marked "sensitive" that was limited to only von Braun, Phillips, and Rees's own personal file, Rees prophetically wrote, "I do not want to elaborate on the possibility that we might lose the S-II-T stage by explosion and heavy damage to the only [S-II] test [stand] we have so far...time delay in this case would be exorbitant." Rees advised that if NAA's performance did not improve in 1966, "NASA [would have] to resort to very drastic measures." He pointed out that the government owned the plant at Seal Beach, and serious consideration should be given as to whether further S-IIs should be contracted with NAA.[54]

No doubt all of this upper management turbulence affected the broad picture and ultimate performance of the S-II stage. But, the MTF engineers were not aware of most of their boss's bickerings, and they plunged ahead to accomplish the immediate goal—static-testing the S-II-T. Glade Woods, NASA engineer said, "The NASA team was pulling for a common cause, as well as the contractors. There was certainly a sense of teamwork and mission that motivated everyone. . .we were doing everything we could to stay on schedule."[55]

Since the NASA-MTF engineers and their contractor counterparts were engaged in the same endeavor, the demanding task was equally arduous for

53. Woods, interview, p. 5; Bilstein, *Stages To Saturn*, pp. 222–225.

54. *Ibid.*

55. Roscoe Nicholson, interview by Charles Bolton, Mississippi Oral History Program of the University of Southern Mississippi, vol. 404, 20 April 1992, pp. 5, 11, SSCHRC; Woods, interview, p. 5.

the builders of the S-II hardware. Roscoe Nicholson, North American-Rocketdyne engine manager, shook his head as he remembered the "hectic" days and long hours of work preceding the first test. "You had to work together, or everything would come unglued," Nicholson said, "The system (government-contractor) worked well because people understood it had to work well! I never noticed a lot of bickering between the government and contractor force. Sometimes you would have a friendly competition over certain things, but you had to work together."[56]

The long, "ungodly" hours took their toll on the workers and their families, and tempers got a "little short." Nicholson recalled, "You just had to go home and get a good night's sleep and come back and forget it the next day." The motivation factor that Gordon Artley believed was so important, and the sense of national pride to beat the Soviets to the Moon that William Eaton spoke of, were major reasons for the ultimate success of the MTF team. Woods said that the feeling of patriotism associated with the "Moon race" was foremost on everyone's mind.[57]

Fire In The Bucket

Engineers on the MTF test team uncovered numerous technical problems while preparing the S-II-T for its first test. Correcting these problems delayed the static firing months beyond the previously announced 2 January 1966 date. Some problems were traced back to the manufacturing plant at Seal Beach where workers had trouble with the unusually long welding runs and the exterior insulation for the liquid hydrogen tank. Artley recalled that much of the work preparing the stage for testing at the MTF was accomplished in severe adverse conditions while the rocket was erected on the A-2 test stand. The workers tried to protect the rocket from the weather during the Mississippi winter by covering their work areas on the stand with huge sheets of plastic. They erected arc lights and portable heaters to allow around-the-clock work in cold temperatures. "The kind of work we were doing was supposed to have been completed in the environmentally con-

---

56. Nicholson, interview.
57. *Ibid.*; Woods, interview by Bolton, pp. 5-6.

trolled manufacturing plant," Artley said, "and here we were working on the stage in the wind, rain, and cold, with the high Mississippi humidity."[58]

Despite adverse working conditions, the MTF NAA engineers and technicians, and their counterparts with NASA, continued to prepare the S-II-T for its first trial run. The stage had been the center of NASA's attention since its installation on the A-2 test stand 19 October 1965. The nagging problem of tank insulation had been a major concern for the NASA and NAA personnel. Proof-pressure tests of the insulation ended in February without failures, and final checkout of insulation repairs and pressurization of the liquid hydrogen and liquid oxygen tanks were finished the last week in March 1965. Trial tanking and detanking using liquid nitrogen occurred 29–30 March. Personnel completed the liquid hydrogen tanking test 16 April with only minor problems. With the final checkouts complete, excitement was building all over the test facility, at the MSFC, NASA Headquarters, and on the West Coast, where the builders of the S-II rocket were anxiously following the last-minute progress.[59]

The day of the first static test approached and Robert Bush, NASA S-II stage manager, remembered that the site was a "beehive" of activity. "They [the manufacturers] had put so many interlocks into the ground control system to protect us, we had a hard time getting by them to conduct the test," Bush observed. Tom Baggette, the NAA S-II test conductor, remembered that the test team was very tired, "running around the clock" preparing for the test. "Our management was concerned and wanted to limit our work," he said, "but we wanted to get started, to get the firing off."[60]

The long-awaited countdown began in the early morning hours of 22 April with a planned countdown of seven hours leading to a 2:00 p.m. ignition of the one-million-pound-thrust rocket. The Central Control Building (Bldg. 1200) with its 90-foot observation tower was the center of activity for those outside the Test Control Center (TCC), where the NAA team was conducting its countdown. The TCC blockhouse was only 1,200 feet from the A-2 test

---

58. Bilstein, *Stages To Saturn*, p. 222; Jack Manerian, interview by Mack Herring, Bay St. Louis, MS, 1 October 1995; Artley, interview by Herring. Manerian told the author that a number of the workers at the Seal Beach plant "were cooking hamburgers" before they were hired by North American to work in the plant that was building the S-II rocket, indicating that they lacked experience in missile manufacturing.

59. Jones, "A Brief History Of The Mississippi Test Facility," pp. 74–75.

60. Robert "Bob" Bush, interview by Mack Herring, SSC, 25 October 1991; Baggette, interview.

stand, but had concrete and steel walls three feet thick to protect the test team, should a major explosion occur. The Central Control Building was 7,500 feet from the A-2 test stand, an ample distance for unprotected persons.[61]

Most of the test observers gathered in the Central Control Building to witness the historic static firing. A number of "official" visitors from the MSFC, NASA Headquarters, and the West Coast were present. Balch invited a select list of community leaders, and a large number of local and national press representatives came to witness and record the test. The media were well aware that the S-II was the pacing item in America's lunar landing plans, and that the MTF held the key. Television monitors were installed in the 90-foot observation tower of the Central Control Building.[62]

The many glitches the engineers feared began to crop up, causing hold after hold in the countdown. Roy Estess recalled that the test crew was locked inside the TCC for 25 hours during the test. As the countdown extended into the night, many visitors gave up and left. The visiting engineers, who had vested interests in the design and manufacture or in the test procedures, stayed on, catching a few minutes sleep during the holds on couches in the Central Control Building. "Red Crews," made up of expert engineers and technicians, were called to go out on the test stand to work on components. The work was performed under very hazardous conditions, as the test stage was loaded with 371,000 gallons of volatile liquid hydrogen and liquid oxygen.[63]

The test team worked all night trying to complete the first test. Dawn came on 23 April with a heavy mist seeping in from the river and hanging over the test site. The A-2 test stand was barely visible from atop the Central Control Building tower. Finally, Baggette was heard calling out the terminal count "5-4-3-2-1-Ignition!" At 7:33 a.m., a loud "crack" burst the still air and a bright red and orange flame lit up the stand as the flammables in the engine area ignited. An NAA observer called out, "We have fire in the bucket!" The ignition noise was followed by a low rumble, similar to a freight train.[64]

A loud cheer went up in the blockhouse as the tired workers heard Baggette clearly counting upward, "Mainstage 4-5. . .10-11-12-13-14-15," as

61. I. Jerry Hlass, "Search For A Role For A Large Government Test Facility" (master's thesis, George Washington University, June 1971), pp. 7–13, 18.

62. Baggette, interview.

63. NASA-MTF News Release, 23 April 1966, SSCHRC; Baggette, interview.

64. *Ibid.*



A giant plume of vapor billows skyward during the first static firing of the Saturn V second stage prototype (S-II-T) on 23 April 1966 at the Mississippi Test Facility. The test duration was 18 seconds. (SSC-66-1556)

the big rocket stage rumbled through 15 seconds of mainstage static-testing. The S-II-T performed well on its first run; the A-2 test stand and the supporting facilities demonstrated their readiness; and Mississippi officially entered the Space Age.[65]

Seven other tests were conducted with the S-II-T, including one 354-second, full-duration static firing on 20 May. More than 1,100 measurements were recorded by the GE data team during the May test, and the S-II-T's four outboard engines were gimballed during the firing. Von Braun joined the team for the test, proclaiming it "vital" to the Apollo program.[66]

Von Braun was also present for another test, but was disappointed when the firing was postponed and he had to leave at midnight. While waiting for

65. Edwin R. Ling, Sr., *The Space Crescent: The Untold Story* (Huntsville, AL: The Strode Publishers, 1984), p. 146; W.E. Howard and Barney Arender, S-II MTF Stage History Summary, 11 December 1970; NASA-MTF News Release, 20 May 1966, SSCHRC.

66. *Ibid.*; Gimballing of the engines gave directional control to the Saturn V vehicle during flight.

the test, von Braun took note of some deficiencies in the onsite accommodations for entertaining public and media visitors and he recommended changes to Balch. Von Braun told Balch that he should have colorful and exciting exhibits in the lobby of the Central Control Building, depicting the lunar landing and its benefits.[67]

Von Braun also noted the static-testing countdown was audible only to the engineers in the tower, with no adequate way for public visitors to follow the proceedings. He told Balch, "Jack, always remember, it pays to advertise!" Shortly afterward, von Braun sent his best artists and modelmakers down to the MTF to design and build exhibits for the Central Control Building. Several thousand dollars were spent for the public benefit in extending the wiring that carried the countdown voice to all parts of the building. Von Braun's efforts in 1966 were the beginnings of a public visitor's center in the Central Control Building.[68]

Just as the new test team was beginning to enjoy some success in the static firing of the S-II-T, a terrible accident occurred, injuring six workmen, destroying the rocket stage, damaging the test stand, and threatening the entire Apollo program. After a 196-second test on 25 May, the NAA test team put the S-II-T through a series of tests, checking anomalies that were observed during the static firings. As part of the postfiring checkouts, several subsystem tests were conducted involving pressurizing liquid hydrogen tanks with helium. On 28 May, at the conclusion of one of these tests, a tank pressure-sensing line, disconnected for purposes of the test, was not reconnected by the NAA crew. Another crew came on duty and pressurized the tank for the next test. As a result of undetected overpressure, the tank ruptured and was demolished. Six NAA technicians on the stand received minor injuries and were treated at Crosby Memorial Hospital in Picayune, Mississippi. Another workman on the stand escaped injury. Damage to the test stand was considered minor, occurring mostly to the metal siding and the propellant and instrumentation lines. The accident

---

67. Wernher von Braun was a most observant man. He noticed the antiquated speaker systems in the Central Control Building; the cold, opera-house appearance of the big lobby; and most of all the lack of "Space Age" displays and artwork. Von Braun, known for his knack for communications and public relations, promised to "put a bug in Jack Balch's ear" to spiffy up the Central Control Building because a large number of influential visitors were entertained there. He sent Gerd Debeek, his chief modelmaker, and Harry Lange, a talented artist, to design and build exhibits for the building and the observation tower.

68. *Ibid.*

did, however, result in the total destruction of the tankage above the liquid oxygen tank's lower bulkhead.[69]

The accident occurred on a Saturday afternoon during the Memorial Day weekend. The S-II-T accident became major news across the nation, with the Sunday *New York Times* displaying a graphic picture of an "empty" A-2 test stand at the MTF. NAA's Harrison Storms was not able to notify von Braun until Tuesday. Storms reached von Braun's wife in Huntsville; she later said the NAA president was sobbing as he talked to her. Von Braun was spending the long weekend at a lake resort near Huntsville. The next day von Braun told Robert Gilruth, director of the Manned Spacecraft Center at Houston, that he saw nothing basically wrong in the S-II design, but that the S-II problems could be traced to management, procedure, and human error. Von Braun blamed the accident on NAA's Space and Information Systems Division (SISD), saying, "The whole thing is NAA-SISD."[70]

The S-II-T accident may have proved to be a blessing in disguise, since the tank ruptured at a pressure well below design limits. It could have happened later while the Saturn V vehicle was in flight. Von Braun asked Dr. Kurt Debus, director of Kennedy Space Center, to head up an investigative board to study the S-II-T rupture. The board released its findings on 1 September 1965 with a number of recommendations. The board found that the tank ruptured at a pressure of 23 psia. That degree of pressure alone should not have burst the tank—it was, according to the report, "well below the design-allowed pressure of 38 psia, as verified by previous pneumostatic and proof tests." This conclusion led to the investigation of other areas of possible weakness, establishing that the tankage was already under considerable strain from a structural viewpoint due to an ill-fitting, liquid hydrogen fill-and-drain line connection to the stage. Tiny cracks were revealed in the liquid hydrogen feedlines near the rupture area. Inspection of other manufactured stages in production revealed additional minute cracks, leading to considerable delays because of repair and modification work. The good news from the investigation revealed that the basic design of the S-II stage was sound. The report read, "Evidence does not indicate that the failure of the S-II-T resulted from an overall structural design defi-

69. NASA-MTF News Release, 28 May 1966, SSCHRC.

70. *Ibid.*; Ling, *The Space Crescent*, pp. 150–153; Bilstein, *Stages To Saturn*, pp. 229–230; Manerian, interview.

ciency." The board then recommended changes covering NAA's work and test procedures.[71]

A Town Meeting

When the trauma of the S-II incident died down, Balch turned his attention to the communities around the MTF. Balch previously said the MTF was "overexposed" in the media and community. He strongly objected to the practice of issuing frequent reports of workforce buildup and where personnel were living. He referred to this public information release as "the body count." Even though the local media demanded these reports, Balch directed Mack Herring (PIO) to give the reports "only when you absolutely have to." Bay St. Louis continued to lag behind Picayune in the number of employees choosing to live there. Only 470 of the 3,200 MTF permanent personnel lived in Hancock County. Civic leaders complained to Balch and Stennis that Hancock County and Bay St. Louis were not getting a "fair shake." Leo Seal, Jr., a strong supporter of NASA and a lifetime Bay St. Louis resident, urged Balch to give a "straightforward" talk to the people of his hometown. Seal, president of Hancock Bank, was a member of the Hancock County Chamber of Commerce and the NASA-originated Mississippi-Louisiana Planning Commission. Balch scheduled what he called a "town meeting" at the Bay High School gymnasium. It was obvious that Balch felt a strong sense of responsibility for the communities surrounding the MTF site, and he expressed this responsibility many times. In fact, he stressed the federal government's duty to live up to its "promises."[72]

Seal served as master of ceremonies for the town meeting, and Balch told of the "growing pains" of his hometown of Huntsville. Balch explained the problems the town suffered from its long relationship with the government, dating from the location of a chemical arsenal there in 1941. He pointed out that the current local population was 11,000 and that Huntsville's population was 150,000.[73]

---

71. *Ibid.*; Baggette, interview.
72. "Balch Tells Bay Needs And Risks," *The Sea Coast Echo*, 24 March 1966.
73. *Ibid.*

Balch angered some Bay St. Louis residents when he candidly said, "Your schools have a long way to go. That's a shortcoming my people have found." He touched on other areas; "The price of real estate is unbelievably high, and you need modern zoning that is enforced." Balch also brought up the need for a "modern, nationally recognized motel." However, on the positive side, Balch congratulated the mayor and people of Bay St. Louis for their courage to pursue the sewage and water project, "despite the inconvenience." Balch humorously commented that his car got stuck in Bay St. Louis's torn up streets. "I had to call a garage wrecker [tow truck], and then we both got stuck. Finally, we got a bulldozer to get us out." He also made note of the citizens' foresight in building the Stennis International Airport in Hancock County. He promised stable growth "during the next three or four years of rocket testing." Balch said NASA felt considerable responsibility for Hancock County, observing that the site was built on "your land," and "we are living on your tax dollars." Much of Balch's guiding philosophy was expressed in the town meeting. Indeed, his sincere feeling of responsibility for the people of Hancock County and the other communities was one the major reasons for his untiring efforts to search for future missions for the MTF.[74]

Propulsion And Power Politics

The ripples of the town meeting and the S-II-T tank rupture continued to dominate the thoughts of NASA and its community friends as the MTF prepared for arrival of the S-II-1, the first "real" flight stage to be tested at the developing site. Balch found that he had many helpers handling the problems associated with the S-II. The S-II-T incident sent shock waves all the way to the top echelons of the space program, with NASA and NAA managers giving the situation their highest priority. Artley was in charge of activation, which included testing the S-II-T. After Artley moved from the MTF to Kennedy Space Center to continue his work in activation, Auter took over the test manager's job. Auter knew that he had capable leadership in his program managers, Bush for the S-II and Myers for the S-IC. Auter, Bush, and Myers were supported by the best rocket-testing personnel in the country from the

---

74. *Ibid.*

MSFC and the West Coast. With this supporting cast, the creative Balch set out to secure the future of the site for his personal satisfaction, the MTF employees, and the surrounding communities.[75]

Balch was not the only person who wanted to make sure the future of the testing facility was secure. Senator Stennis, a frugal man who did not believe in waste of any kind, was proud of the NASA facility in his home state and wanted it fully utilized. Like Balch, Stennis felt the MTF represented a national investment. In August 1966, Stennis asked William Eaton (GE manager) and Balch for a comprehensive community impact study. The document contained educational as well as economic impact information. The impact data illustrated that the MTF represented a "$315 million public investment," a dollar figure higher than any previously released by the Fortune or Balch NASA-MTF management groups. The report to Stennis also stated the installation became "operational" with the first testing of the S-II-T on 23 April 1966. Balch forwarded the document to Stennis through Harry Gorman (MSFC). This chain of command was required by MSFC management instructions for all congressional correspondence. Balch wanted his MSFC bosses to know of Stennis's strong MTF interest. Stennis proudly released the information to newspapers all over his home state. The study included data on contracts, personnel, technical data, educational profiles, and public information on taxes and municipal spending.[76]

While the "good news" about the NASA facility was spreading around the state, and the testing operations were beginning to start, Balch invited Stennis for an "inspection visit" to show the site's readiness to participate in America's space program. The S-II-1 arrived at the MTF dock on 13 August 1966, but numerous modifications were needed before installing it in the A-2 test stand on 17 October. The rocket stage was test-fired on 1 December for 363 seconds, a full-duration test since this was the length of time it would operate in flight.[77]

---

75. Bilstein, *Stages To Saturn*, pp. 229–230; Artley, interview.

76. Balch to Gorman/Gorman to Stennis; "Background and Economic Impact of the NASA Mississippi Test Facility," undated economic study; "Stennis Reports Test Site Impact," *The Daily Herald*, 12 July 1966.

77. Howard and Arender, "S-II MTF Stage History," 11 December 1970. The S-II-T incident focused the entire space agency's attention on the S-II-1. With the MTF alive with experts in rocketry, Balch began turning his attention to the future of the MTF. NASA had "dreams" but no concrete plans beyond the Apollo program. The fact that no new programs were scheduled for the MTF beyond the last rocket test in 1970 was disturbing for Balch.



U.S. Sen. John C. Stennis (left) is captured in a moment of levity in the S-II Test Control Center with officials of the Mississippi Test Facility in December 1966. Pictured with Stennis, from left, are Tom Baggette and Gerry Wilson of North American Aviation, MTF Director Jackson Balch, and Meryl Sanders of NASA. (SSC-66-4691)

On 6 December 1966, Senator Stennis visited the MTF. This visit marked the beginning of a unique relationship between Balch and Stennis that resulted in a change in the direction of the MTF—from a purely rocket-stage testing facility into a multiagency scientific research center. Behind closed doors, Balch told Stennis that "NASA [had] no plans for the facility beyond the Apollo program." William "Bill" Spell, Stennis's aide for military affairs, had accompanied Stennis to the MTF, and Stennis directed him to release pictures and television clips to the state news media showing the Senator visiting the test complex. Balch arranged for a number of Mississippi engineers to greet the Senator at several workstations. These engineers included Henry Auter, Myrl Sanders, and Wayne Mooneyhan, NASA; Will Barrentine, GE; and Tom Baggette, NAA. Seeing fellow Mississippians in important positions pleased the Senator.[78]

78. NASA-MTF News Release, 6 December 1966, SSCHRC.

After the meeting with Stennis, Balch entered an important note in his "significant actions" log that stated Stennis "showed concern about future utilization of [the] MTF and community commitments." At the time, Stennis was a ranking member of the Armed Services Committee, Appropriations Committee, and the Aeronautical and Space Sciences Committee. He was also chairman of the Preparedness Investigation Subcommittee that conducted the "missile gap" hearings, which set off the early alarms of the Soviet space exploration advantage. Stennis held a press conference before leaving the test site and complimented the workers, declaring them "some of the best trained and most conscientious workers I have ever met at any installation." Stennis also promised that he would discuss the future of the MTF with the "highest NASA officials" to make sure "the investment we have made in this fine installation is used fully and completely." The theme of "full utilization" was to become the battle cry of Balch and Stennis as they jointly pursued future programs for the site.[79]

79. "Significant Actions Changing MTF Utilization," Balch files, 1966.

CHAPTER 7

The Winds of Change

While his engineers were focused on testing Saturn rockets bound for the Moon, Jackson Balch set out on a journey in search of a new mission for the Mississippi Test Facility (MTF). Before the search was completed, the expedition extended beyond the hills of Huntsville, through the halls of the Congress, and past the closed doors of the Nixon White House. To the consternation of his bosses, the pied piper of Devil's Swamp lured prospects from all over the world to window-shop at the new crossroads of science in Mississippi.[1]

As the MTF engineers were celebrating America's first lunar landing, an ill wind was brewing in the Caribbean Sea that would change many of their lives forever. On 17 August 1969, a powerful hurricane named Camille struck the Gulf Coast with a devastating blow that left hundreds dead and thousands homeless. The morning after, the NASA-MTF team raised American flags on site in a symbolic gesture of determined solidarity with their coastal neighbors. The Gulf Coast residents set out to rebuild their homes and NASA employees began a search for new MTF missions.[2]

---

1. Edmund R. Gray and Herbert G. Hicks, "The Mississippi Test Facility: A Study In Organizational Viability," occasional papers, no. 4, College of Business Administration, Louisiana State University, May 1971, pp. 20–24.
2. Alice Etheridge, "Least We Forget, Camille and MTF," *GE MTSD Booster*, vol. 7, no. 16, 17 August 1970, Stennis Space Center Historical Records Collection, Stennis Space Center, MS, (henceforth referred to as SSCHRC).

The final Gemini mission on 15 November 1965 was of more than passing interest to the space team in Mississippi. When Astronauts James A. Lovell, Jr., and Edwin E. Aldrin, Jr., splashed down in the Atlantic Ocean after a highly successful Gemini 11 orbital flight, the NASA-MTF space workers knew their time at bat in the Apollo program was not far off. The big push to finish testing the S-II-1 continued on 30 December 1966 with a full-duration firing of 363 seconds.[3]

The activity at the MTF quickly shifted from construction-activation to the operation phase as projects were finished and workers began leaving the site. The giant S-IC-T, a test version of the Saturn V first-stage booster, arrived on site and was installed in the dual B-1/B-2 test stand on 23 October 1966. The huge first-stage booster was the free-world's largest and most powerful rocket. Designed to lift the 6-million-pound Apollo/Saturn V space vehicle off the pad and send it to the Moon, the S-IC was 138 feet long and 33 feet in diameter. The booster stage generated 7.5 million pounds of thrust and was the most powerful rocket ever built in America. The first-stage booster was test-fired at Marshall Space Flight Center (MSFC) 15 times and later brought to the MTF to check out the massive B-1/B-2 test stand and its supporting systems. By the end of 1966, the "big Bertha" was being put through prestatic test checkouts by a Boeing Company aerospace team. A research and development stand at the MSFC static-fired the first three Saturn flight stages. The Saturn V rocket stages were tested by both NASA and Boeing personnel in the MSFC Test Division's facilities. At the same time, the big dual stand in Mississippi was being scheduled for acceptance testing of these flight stages.[4]

With three Saturn V stage test stands in Mississippi, a sense of ownership in America's space program prevailed at the MTF within the teams representing NASA, General Electric (GE), North American Aviation (NAA), and Boeing. As in any program of such great magnitude, moments of sadness were experienced, along with feelings of triumph. For example, the MTF workers were saddened by the accidental deaths of seven workers during construction of the facility. The MTF team also shared in a national tragedy 27 January 1967, when an accidental fire broke out in the Apollo 1 spacecraft

3. Al Hall, ed., *Man In Space: A New Environment*, vol. 2 (Los Angeles: Peterson Publishing Co., 1974), pp. 128–137.

4. Test & Quality Evaluation Office, MSFC-MTF, "Test Program Summary For Saturn V/Apollo Program S-IC Stage," 29 October 1970, pp. 1–5, 22, SSCHRC.

and quickly killed the astronaut crew during a routine ground test of the three-man craft at the Kennedy Space Center (KSC). The three astronauts, Virgil L. Grissom, Edward H. White, II, and Roger B. Chaffee, distinguished themselves earlier in the Mercury and Gemini programs. The aftermath of the accident caused further upheavals in NAA's management and manufacturing processes. For the first time, the focus of attention or "long pole" of the Apollo program shifted from the S-II to the Apollo command module, where investigators found numerous problems in the design and manufacture of the lunar-bound craft.[5]

Meanwhile, the Boeing test team was anxious to get its program at the MTF under way. The team approached the first flight-stage test with the high degree of confidence they developed while working with Heimburg's experienced MSFC rocket crews. The main purpose of the first S-IC-T tests was to check out the big B-1/B-2 test stand and its supporting facilities. Only the B-2 position (east side) of the test stand was activated for testing, leaving the B-1 available for use in case of an accident on the B-2 side.[6]

In addition to using the giant test stand for the first time, NASA and the Boeing team were concerned about the noise the big S-IC would produce with its 7.5-million-pound thrust. The MTF acoustic-buffer zone extended six miles from the test stand in every direction, and NASA did not expect the sound would be excessively loud beyond the buffer zone. The flame-deflector bucket on the B-2 side of the dual position S-IC test stand was pointed due north, with the nearest community of any size, Picayune, located north by northwest of the test complex. NASA knew, however, that the monstrous S-IC booster was as noisy as it was powerful, producing 211 decibels of sound at the base of the test stand.[7]

Knowing that its testing program depended on public acceptance, NASA continued its acoustic studies, which were initiated in December 1962. The U.S. Weather Bureau and GE personnel operated the MTF Acoustics Laboratory, where data were recorded and analyzed for prediction of sound

---

5. Al Hall, ed., *Man In Space: The Power And The Glory*, vol. 3 (Los Angeles: Peterson Publishing Co., 1974), pp. 52–63.
6. Mike Wright, "Saturn V Project Posed Monumental Challenge To Center," *The (MSFC) Marshall Star*, 25 April 1990, p. 3, SSCHRC; I. Jerry Hlass, "Search For A Role For A Large Government Test Facility" (master's thesis, George Washington University, June 1971).
7. NASA-MTF Press Release, 13 March 1967, SSCHRC.

propagation. GE personnel sounded a giant acoustic horn, and the Weather Bureau sent balloons aloft carrying instruments for predicting sound-level propagation to the surrounding communities.[8]

The acoustics experts set up measuring devices in the communities surrounding the MTF in anticipation of the 3 March 1967 first S-IC-T test firing. The specialists sounded the giant horn several times to simulate the test-firing sound levels; recorded the sound levels; and also sent weather balloons aloft to measure atmospheric conditions. The resulting data were fed into computers to determine a sound profile of the area. These tests were done because atmospheric conditions have a direct and major effect on sound travel and intensity. A temperature inversion can cause sound, which normally goes up into the atmosphere, to bounce back to the ground.[9]

The MTF initiated an additional acoustics study before the first test-firing of the S-IC-T. This study was to determine how far away from the test stand observers should be when exposed to the noise of the static firing. The resulting statistical data enabled acoustics experts to determine the effects on human hearing of long-term exposure to rocket-testing noise levels. The viewing area was 5,200 feet from the test stand, and 20 volunteer employees were accepted for testing. The MTF medical clinic, operated by GE, tested the hearing levels of the volunteers before the S-IC-T test to form a baseline. On the day of the static-firing, volunteers were in the viewing area, along with a doctor and nurses from the clinic in case any employee felt undue discomfort. The volunteers were the only employees whose ears were unprotected the day of the firing. Other unprotected observers were located over 7,500 feet from the S-IC-T test stand at the Central Control Building.[10]

Despite precautions taken by NASA, local concerns about the noise levels persisted, partially caused by media misinformation. A national newspaper even ran a story that read, "During test runs, the 7.5-million-pound-thrust first [test] stand will generate screaming torrents of noise strong enough to kill or maim unprotected persons within five miles." Newspaper reports such as this helped justify the large buffer zone, but did nothing to allay fears of those who had true concern for rocket test-firing noise. NASA wanted people in the area

---

8. *Ibid.*
9. Lelyn Nybo, interview by Mack Herring, Waveland, MS, 2 October 1995.
10. NASA-MTF News Release, 13 March 1967, SSCHRC.

to be aware of the test, so the loud noise of the S-IC-T test-firing would not frighten them. Most media cooperated with the MTF Public Information Officer (PIO) and informed the public of the test with accurate news stories and radio/television bulletins.[11]

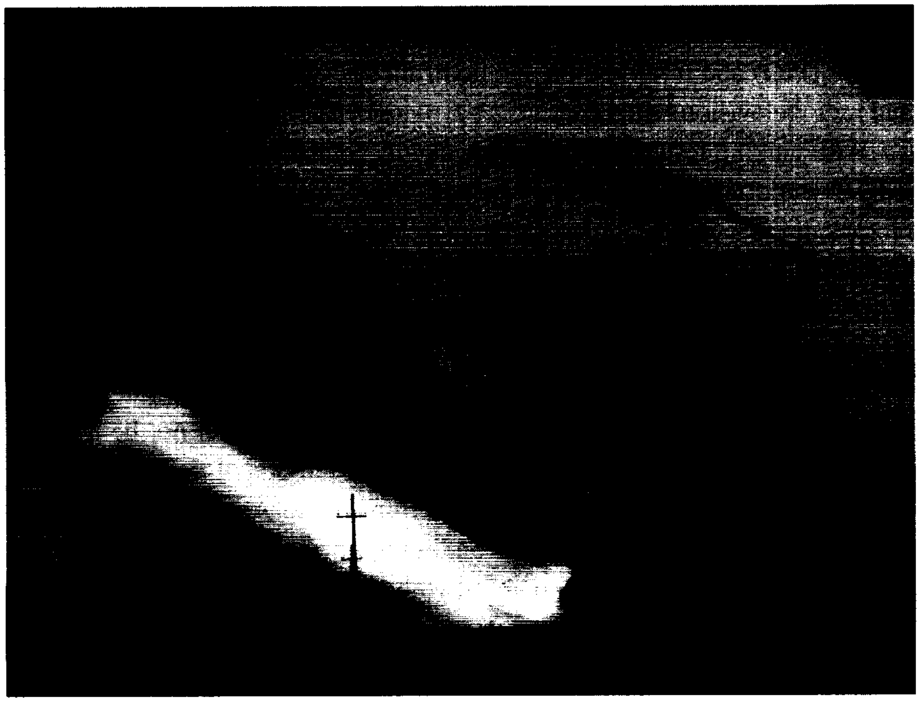
With tanking tests and systems checkouts completed, the day of the first S-IC-T static test in Mississippi arrived. More anxiety existed outside the blockhouse than inside; the independent Boeing team was confident their first 15-second test would be successful. Balch held a prefiring meeting in his office with Lelyn "Lee" Nybo, MTF's meteorologist and acoustics expert, giving staff members a briefing on predicted sound propagation in the area. Heimburg, down from Huntsville to view the firing, attended the briefing. Nybo told Balch that noise from the short test-firing would not be a major concern in the communities because of the short duration of the test. With the benefit of data gathered by the Weather Bureau and Acoustics Laboratory, Nybo did point out that weather conditions on that March day were not "ideal." Heimburg wanted to go ahead with the test, citing his "all-weather" testing experiences in Huntsville.[12]

With Boeing's test conductor James Dezzo at the console, the giant rocket roared to life at 5:21 p.m., and the sound thundered across the piney woods for 15 seconds. A brilliant red and orange flame streaked out from the base of the flame-deflector bucket into the air. Unlike the invisible S-II liquid hydrogen and liquid oxygen flame, the RP-1 kerosene and liquid oxygen flame was so bright it produced huge flashes of light as the five F-1 engines rumbled and clattered. The low-frequency sound produced by the test-firing was heard as far away as Picayune, Mississippi, and the sound waves shattered a plate-glass window in a downtown Picayune bank building.[13]

Even though the first firing was only 15 seconds, the test lasted long enough for engineers to record approximately 850 measurements of the rocket-stage performance, and it proved the dual B-1/B-2 test stand's operational readiness. These measurements included aspects such as stress, engine temperatures and thrust, propellant tank temperatures and pressures, vibrations, and propellant flow rates. The test stand's giant flame-deflector bucket

---

11. William E. Howard, "Mississippi Moon Base," *The New York Times*, 8 November 1963.
12. Myron L. "Mike" Myers, interview by Mack Herring, Waveland, MS, 2 October 1995; Nybo, interview.
13. NASA-MTF News Release, 13 March 1967, SSCHRC; Myers, interview.



The first stage of the huge Saturn V rocket undergoes a hot firing on the B-2 stand in support of America's lunar landing mission during the Apollo program in the 1960s. The first stage was powered by five F-1 engines that produced more than 7-1/2 million pounds of thrust. (SSC-67-2537C)

proved efficient, with water rushing through its systems at the rate of 300,000 gallons of water per minute. Postfiring checkouts evaluated the overall effect of the static test on the rocket stage. These checkouts, similar to prestatic test-firing checkouts, indicated that few overall changes were observed. A second and final test of the S-IC-T at the MTF was planned.[14]

The second S-1C-T test was conducted by Boeing on 17 March 1967 for 60 seconds, giving NASA the confidence to pronounce the MTF "fully" operational. With this designation, the facility was ready to begin its appointed task of acceptance testing of the first and second stages of the Apollo/Saturn V space vehicle, a process that was to go by all too quickly.[15]

14. Test & Quality Evaluation Office, S-IC Branch, "Test Program Summary, Saturn V/Apollo Program, S-IC Stage," 29 October 1970, pp. 22–23, SSCHRC.

15. *Ibid.*

Just five days after the S-IC-T readiness test was completed, Balch arranged a meeting on 22 March 1967 with Senator Stennis and von Braun to discuss the "future of [the] MTF." The meeting was the first of many between Stennis and von Braun—two men who had great influence on the developing Mississippi site. Von Braun noted that he expected the declining MTF workforce would level off at "about 2,600," and this would negatively impact local communities. Von Braun's meeting with Stennis thus validated Balch's earlier December 1966 warning to Stennis that NASA had no plans for the MTF after the Saturn V test programs were completed.[16]

Von Braun had his hands full directing the launch vehicle program for the Apollo program and had little time left to worry about the future beyond the lunar landing. He not only had the MTF development and operational testing to worry about, but the versatile scientist-manager also was deeply concerned with the S-IV-B third stage of the giant Saturn V, with its intricate instrument unit, and the integration of the entire vehicle.[17]

Balch was relieved of a great deal of pressure when the S-II and S-IC stages were static-fired, signaling the MTF's operational readiness. He and his staff spent hundreds of hours in meetings devising a tight, quality- and product-reliability program, utilizing the combined expertise of NASA, Air Force, and contractor personnel. At the same time, Balch was faced with the loss of one of his close advisors, Gordon Artley. As the activation phase drew to a close, Artley moved on to head up a similar activation program at the KSC.[18]

With Artley leaving, Balch placed his capable deputy, Henry Auter, in charge of the Test and Quality Evaluation Office. Balch appointed Auter because he was an experienced and competent MSFC test engineer. At the MSFC, he helped build the Interim Test Stand that was the site for testing the Jupiter-C that launched the free world's first satellite. Auter was also a key member of the test team that tested the Mercury-Redstone rocket that launched the first American into space. Henry Auter not only had the support

16. NASA-MTF Director's Office Files, "Significant Actions, Changing MTF Utilization," 22 March 1967, SSCHRC, p. 1.

17. Edgar M. Cortright, ed., *Apollo Expeditions To The Moon*; Wernher von Braun, "Saturn The Giant" (Washington, DC: NASA SP-350, 1975), pp. 41–57; See also Roger Bilstein, *Stages To Saturn, A Technological History Of The Apollo Saturn Launch Vehicles*, pp. 347–377; Jackson Balch briefing to Gen. Sam Phillips, NASA-MTF transcript, August 1966, SSCHRC.

18. Jackson Balch briefing.

of Balch, but he also had Heimburg's complete confidence. This relationship between Heimburg and Auter helped bridge management differences existing between Balch and Heimburg.[19]

Balch and Auter assembled an excellent group of engineers, most were from the MSFC, to help manage the Saturn V stage testing. These managing engineers included men such as Mike Myers, chief of the S-IC Branch; Leslie B. "Boyce" Mix, S-IC assistant manager; Bob Bush, S-II Branch manager; Myrl Sanders, chief of the Engine Branch; and William L. Hopkins, chief of the Evaluation Engineering office. Other talented engineers who went on to become MTF leaders were James E. "Jim" Coward, Kenneth R. "Ken" Daughtrey, Roy Estess, James H. "Harry" Guin, Robert B. "Bobby" Hegwood, Floyd C. Herbert, William D. "Doug" Howard, Teddy M. "Ted" LaMunyon, Darden W. "Wayne" Mooneyhan, William G. "Bill" Spradlin, James L. "Jim" Taylor, and Earl G. "Glade" Woods.[20]

The Search

Once the strong test organization was in place and the North American Rockwell and Boeing test teams gained even more experience static firing the rocket stages, Balch found his task as manager becoming more "routine." The restless manager now had time to explore the future of the budding MTF. Although there was nothing "secret" about the long-range threat of the MTF's inability to survive beyond the Apollo program, Balch was apparently the only official within the NASA hierarchy who perceived this threat.[21]

Two factors became apparent to Balch when he studied the future viability of the MTF: (1) static-testing the Apollo/Saturn V stages was scheduled to terminate in December 1970, and (2) the MTF was operating considerably below full capacity and would likely continue to do so. Balch perceived these factors as detrimental to his organization's survival, and he saw no funded NASA programs in the immediate future that would bring work to the MTF.

19. NASA-MTF Manager, Memorandum To All Employees, "Provisional Personnel Assignments," 1967, SSCHRC.

20. NASA-MTF Manager, Memorandum To All Employees; Gray and Hicks, "A Study In Organizational Viability," pp. 24–25.

21. Gray and Hicks, "A Study In Organizational Viability," pp. 20–21.

Part of the problem manifesting itself during 1967 was the cyclical nature of the rocket-testing operation. During the five-day period around a static firing, the MTF personnel would work above full-capacity operation (overtime work was required). During the period between firings, however, facilities and personnel were not being used at full potential. In the early stages of his campaign, Balch referred to the MTF as "underutilized." Later, Stennis joined Balch in an all-out quest to gain "full utilization."[22]

Balch found that his MSFC bosses had little concern for the MTF not having a mission beyond testing the Saturn V stages in 1970. Balch's colleagues at the MSFC were reluctant to assist because they wanted future programs to be located there. The MSFC managers were so caught up in the Apollo program, they were planning extended lunar exploration and other deep-space programs such as a Mars mission, and they were not concerned with Balch's immediate plight. Besides, most NASA Headquarters planners felt that a lunar landing would herald future space programs and funding would then be generated for the Agency.[23]

Balch, however, felt the lunar landing would be the "beginning of the end" of a major national effort in space exploration. He believed the escalation of the Vietnam War and the threat of rising inflation would change the nation's priorities, shifting attention and focus away from the space program. Balch also recognized that a growing concern over degradation of the environment existed in the United States. Many Americans saw a need for national measures to preserve the country's natural resources. Balch became an early advocate for the revival of a national conservation program, and he gained support from prominent regional and national conservationists.[24]

Once Balch recognized that no future mission was planned for the MTF, he began a search for new missions for the facility. Balch's motivation apparently came from his intense desire to succeed as a manager and his moral and patriotic desire to continue the MTF's usefulness. He wanted the MTF to be perceived as beneficial to (1) America's taxpayers, who furnished the funding; (2) the people of the local area, who gave up their land and funded the

---

22. *Ibid.*, pp. 22–24.
23. Eberhard Rees, speech to Huntsville, AL, Chamber of Commerce, 14 October 1966.
24. E.W. "Van" King, interview by Mack Herring, Pass Christian, MS, 5 October 1995; "NASA Chief Issues Christmas Message," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 23 December 1966.

improvements in their communities; and (3) the MTF employees, who gave up jobs elsewhere to stake their futures in the new installation.[25]

Like Artley, Balch was a charismatic, spellbinding individual. In addition, he often motivated his own staff, as well as captivated and inspired others outside his organization to work hard to achieve mutual goals. Balch was also an intimidating and threatening force to those who opposed his views and actions—many of whom were his own bosses and colleagues in the NASA chain of command.[26]

When Balch could not find allies at the MSFC or NASA Headquarters to help promote his cause, he called his staff together to inform them of the post-Apollo dilemma facing the MTF. He rented a suite of rooms at the Ramada Inn in Waveland, Mississippi, (the Holiday Inn in 1997) for an "all day" meeting in December 1967. At the meeting, Balch asked his staff to join him in brainstorming future plans for their organization. At the beginning of the meeting, Balch told the assembled staff members (about 15 people) that no new programs were planned for the MTF beyond the lunar landing. To some, the lack of future plans at the MTF was surprising and shocking news. On a portable chalkboard, he recorded the ideas the group proposed to keep the base viable after the Apollo program testing ended. Most of the ideas included new rocket-testing missions. In keeping with the brainstorming nature of the meeting, the ideas also included such radical proposals as withdrawing from the MSFC and forming a separate NASA field center. The idea of a separate center, however, was discarded by Balch and most of the staff, because the majority of those present thought the MSFC was needed to furnish funding for future basic operations.[27]

The December meeting was the first act in Balch's offensive to gain new missions for the MTF, and it was an introduction to his tenacious planning ability. The session, which many mark as the beginning of the search for a new mission for the MTF, started at 8:00 a.m. and went on until midnight. After the offsite staff meeting, Balch held another meeting with the NASA employees in the big conference room of the Engineering and Administration Building. He told the standing-room-only crowd that "nothing" was planned

25. Gray and Hicks, "A Study In Organizational Viability," pp. 26–30; King, interview.

26. King, interview.

27. A.J. "Jack" Rogers, Jr., interview by Mack Herring; Ted LaMunyon, interview by Steve Paterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 409, June 1992.

for the MTF after completion of the Saturn V testing. At this point, Balch directed Wayne Mooneyhan and Roy Estess to wind down their work at the onsite test complex. This directive was issued so Mooneyhan and Estess would be able to join Balch in the director's office and begin assisting in the search for new business for the facility.[28]

The timing of Balch's initial forays into the world of science and technology outside NASA could not have been better planned. NASA, and especially its managers, were enjoying a great deal of publicity due to international attention by the news media. The Mercury and Gemini programs ended successfully, and the mammoth undertaking of the Apollo program had captured the public's imagination. Balch used this attention to open doors in his search for new MTF business. His position as manager of a major NASA installation gave him an instant introduction to heads of federal and state technical organizations, university presidents, and to politicians seeking to help their constituencies.[29]

At first, Balch sought to find future missions within the NASA organization, hoping that von Braun would be sympathetic to the MTF cause. Having already been rebuffed by lower ranking members of the MSFC management, Balch hoped von Braun would want to preserve the MTF for future rocket testing and other propulsion development projects. The MTF manager found the idea of "[walking] away" from the multimillion dollar MTF facility an unacceptable action for NASA. Unfortunately, the MSFC engineers looked at the MTF as a "mass of brick and mortar" to be managed and operated as a "blue collar" test plant with a handful of engineers. Balch, on the other hand, saw the facility as a "living, breathing" scientific center with the potential to conduct almost any sophisticated technical program.[30]

Balch thought the open-minded von Braun would see his viewpoint. To this end, Balch presented a proposal in 1967 to von Braun and his staff that involved the consolidation of all rocket testing, including the J-2 engine, the F-1 engine, and the S-IV-B third stage, at the MTF. He further recommended that all post-

---

28. *Ibid.*

29. See Loyd S. Swenson, Jr., James M. Grimwood, and Charles C. Alexander, *This New Ocean*, and John Barbour's *Footprints On The Moon* for accounts of Project Mercury; See Henry C. Dethloff *Suddenly Tomorrow Came. . . A History Of The Johnson Space Center* (Washington, DC: NASA SP-4307, 1993) for evidence of success of Projects Mercury and Gemini.

30. Gray and Hicks, "A Study In Organizational Viability, p. 31; King, interview; Roy L. Bullock, "Mississippi Test Facility Utilization Data," NASA Headquarters executive study, attachment 2, 1968, SSCHRC.

test checkout be done at the MTF. According to Balch's proposal, this move would fill the inactive periods between tests and would save NASA $17 million per year on Saturn program operating costs. Von Braun referred Balch's proposal to a study committee at the MSFC, where it was disapproved.[31]

The rejection more than likely took place because von Braun was so deeply involved in the upcoming lunar landing. Consequently, von Braun delegated the decision on Balch's proposal to his staff with the intention of referring to it after the first lunar landing. Balch, however, said von Braun was "sympathetic" to the MTF cause and "looked the other way" so Balch could pursue new missions without any hinderance. Balch came to realize that his MSFC colleagues wanted to ensure their own survival and had little interest in saving NASA $17 million per year, if in doing so, the plan threatened the future of MSFC. Most of the MSFC and NASA Headquarters personnel felt the public would rally around NASA, after the first lunar landing, with funding for future programs.[32]

Balch's response to the apathetic attitude regarding the future of the MTF was to solicit advice from E.W. "Van" King, a man he brought from Huntsville to work at the MTF. Balch knew that King was successful in obtaining new missions for the Army Rocket and Guided Missile Agency at Redstone Arsenal. Balch told King he wanted him to first head up the MTF Site Operations Office as a "temporary move" and that the office would be a "holding place" for King until a more formal Future Projects Office could be set up.[33]

The MTF Site Operations Office was similar to an Army post's Engineering Office. In King's words, the office "ran itself," due to the experienced people selected for management positions. Heading up the branch functions were Eugene A. Burke, Safety Office; Waldo Dearing, Base Operations Branch; W.L. "Willie" Shippey, Range Operations Branch; and A.J. "Jack" Rogers, Jr., Facilities Engineering Branch. King devoted most of his time to studying the technical market nationwide to see which functions and agencies would be suitable for the MTF. The capable staff in the Site Operations Office also provided logistical support to help Balch analyze the potential of future prospects.[34]

---

31. King, interview; Jackson Balch to distribution, "Provisional Personnel Assignments," 1966.
32. King, interview; Gray and Hicks, "A Study In Organizational Viability."
33. Gray and Hicks, "A Study In Organizational Viabiltiy"; King, interview.
34. King, interview; Bullock, "MTF Utilization Data," attachment 3.

One of the first moves Balch made toward the goal of full utilization of the MTF was to encourage the onsite research staffs from Mississippi State University and Louisiana State University to assist in lobbying for new technical and scientific business. The two universities conducted a total of eight onsite projects, using the GE data reduction facilities. Through the universities, Balch and his staff met a number of scientists with connections to the Governors of Louisiana and Mississippi.[35]

As Balch, King, and other selected staffers began searching in 1968 for new missions outside of NASA, Senator Stennis was drawn more and more into the struggles occurring at the MTF. King remembered working closely with William "Bill" Spell, Stennis's pointman for the Department of Defense (DoD) and for the MTF. Spell, an attorney, was an excellent political public relations man. Balch described him as Stennis's "Machiavellian aide." Spell and Balch quickly became close friends, sharing a dream to see the new MTF emerge as a fully utilized scientific utopia.[36]

The Community Joins Balch

By mid-1968, with a few members of his staff and the office of Senator Stennis on his marketing team, Balch moved to recruit key community leaders to help in the push for new business. After all, the investments for expansion and improvements that the local communities made to meet the massive influx of the MTF personnel were in danger as the site population began to decline in 1968. The towns in the immediate area had increased their bonded indebtedness from less than one-half million dollars to more than $25 million in less than five years. With the installation's construction and activation phases completed and the test teams becoming more proficient in their work, the employee population dropped from 6,401 in the summer of 1965 to 2,970 operations phase personnel in mid-1968. The occupancy rate of new apartment buildings in the towns around the MTF dropped to 50 percent. The whopping $72 million payroll in 1965 also dropped accordingly. The community leaders, who worked so hard to accommodate

---

35. Bullock, "MTF Utilization Data," attachment 3.
36. King, interview.

the test site, were stunned as they watched their investments in the space enterprise dwindle daily.[37]

The economic boom lasted only three years before it began declining so dramatically. Community leaders were astonished to see their new MTF neighbors moving out in droves. In fact, the employment curve dropped almost as fast as it had gone up just three years earlier.[38]

National news had a special kind of validity for the local business people. News from afar appearing in long-standing, reputable publications attracted the attention of local investors, as well as their national lenders and counterparts. For example, an article in *The Wall Street Journal* generated serious anxiety within the local business community, at NASA Headquarters, and, to NASA's chagrin, in the office of Senator Stennis. The pessimistic article was exactly what Stennis did not want to read in such a prestigious national publication.[39]

The noted business and financial journal carried a headline that read "No Work Slated After '69 for NASA Base In Lower Mississippi That Cost $315 Million." The part most remembered by readers was the line that referred to the MTF as a Space Age "white elephant."[40]

The "story behind the story" regarding the "white elephant" article beautifully illustrates how Balch searched for new assignments. He used every tool available to him as a manager. Since Balch knew that Stennis and his bosses at NASA Headquarters read *The Wall Street Journal* every day, Balch told Mack Herring, MTF PAO, that he would like to read a big headline in *The Wall Street Journal* about the underutilized condition of the MTF. Herring discussed the matter with his GE counterparts onsite and at Valley Forge, Pennsylvania. GE, through its public relations staff, "leaked" the news tip to *The Wall Street Journal* and enticed a reporter to come to the MTF to do a story. The Component Test Facility was built but never used. One of the largest MTF support facilities, it was planned and built by the MSFC for testing Saturn and other rocket components. Balch made sure a big padlock with chains was placed on

---

37. "Space Age: Boom Or Bust," *U.S. News & World Report*, 27 September 1967; James C. Tanner, "No Work Slated After 1969 For NASA Base In Lower Mississippi," *The Wall Street Journal*, 10 January 1968.

38. NASA-MTF Staff, "Key Press Announcements Tell MTF Story," SSCHRC, briefing book prepared for Sen. Stennis by Balch and his staff.

39. Tanner, "No Work Slated. . . ," *The Wall Street Journal*.

40. *Ibid.*; Balch wanted to call attention to underutilized facilities at the MTF. Since he was prohibited from talking to NASA Heaquarters managers and Sen. Stennis by his MSFC bosses, Balch knew a "leaked" story in *The Wall Street Journal* would inform those that he wanted to know about the situation at the MTF.

the empty building's front door and that *The Wall Street Journal's* reporter was escorted to see the new, but as yet, unused facility. *The Wall Street Journal* story was the first direct use Balch made of the news media to carry his message.[41]

The "white elephant" story had the intended results Balch was looking for. The Picayune Chamber of Commerce announced it was launching a campaign to find new business for the MTF when the Apollo program testing ended. The Chamber cited *The Wall Street Journal* story as the reason for their planned search. A copy of the resolution by the Chamber was sent to Senator Stennis, further aggravating him with evidence of the decline of the NASA project in his home state. In response, Stennis sent a strong letter to NASA Headquarters urging them to take steps to secure future work for the MTF beyond the Apollo era.[42]

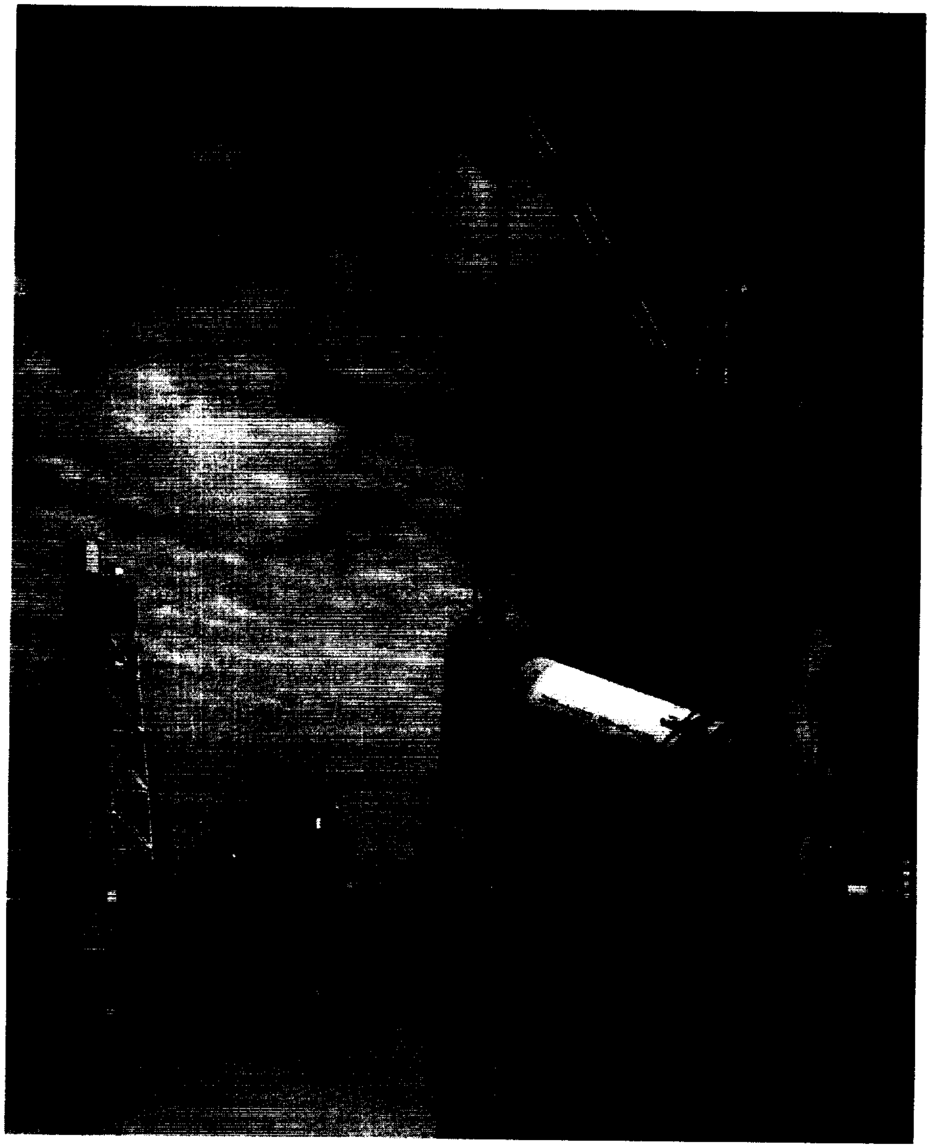
MTF Busy Testing, Planning Future

Despite the commotion in the media predicting a bleak future for the test facility, employees charged with static test-firing the mighty rocket stages for the Apollo program continued their tests. Roscoe Nicholson, an NAA engine expert, said, "The test complex was another world. We left all of the politics up to the guys in the E&A [Engineering and Administration] Building." And Nicholson was right. With the pressure to test the rocket stages and ship them to the KSC for launch, the MTF test crews had little time to worry about the future.[43]

The work situation at the MTF was like two different worlds, with the buildup of testing for the Apollo program and Balch's quest for new missions. The NAA and Boeing test teams conducted six static firings in 1967, nine in 1968, and eleven in 1969. These tests included eleven S-II and nine S-IC flight stages. Newspapers around the state noted the bustle with front page news stories in March 1968, saying that all three test positions were "filled" with three Saturn V stages.[44]

---

41. *Ibid.*
42. "Chamber Seeks New Uses For Test Site," *The Picayune (MS) Item* (henceforth referred to as *Picayune Item*), 7 March 1968.
43. Nicholson, interview.
44. Test and Quality Evaluation Office, "S-II Stage History Summary," p. 13, SSCHRC; "S-IC Stage History Summary," 11 December 1970, p. 11, SSCHRC; "Start of Busiest Year At MTF Signaled By 18-Second Test Firing," *The Slidell (LA) Times* (henceforth referred to as *The Slidell Times*), 1 February 1968; "First Full House Reported In Test Stands At Test Site," *Picayune Item*, 7 March 1968.



An S-II stage of the Saturn V rocket is hoisted into the A-2 test stand at the Mississippi Test Facility. This was the second stage of the 365-foot-tall rocket which was powered by five J-2 engines. (SSC-67-701C)

On the other hand, at the time of the rocket "full house" at the MTF, Balch was painting a bleak picture of the operation in his dealings with Stennis. Reacting to Balch and the community leaders in the area, Stennis on 15 March 1968 requested that Balch brief him on the plans that NASA had for the base beyond the Apollo program.[45]

While the MTF continued testing rockets, NASA Administrator Webb also requested that Balch brief him on the status of the MTF so he would be better prepared to discuss the installation's future with Stennis. Webb contracted with Dr. Mary Holman, a professor at George Washington University, to assist him with a study and recommendation of a future path for the MTF. Holman, with the help of NASA Headquarters and the MTF personnel, prepared Webb for the meeting with Stennis. In her report, Holman observed, "If the nation decides that it wants to drastically reduce its resource allocation for the exploration of space, the level and structure of employment in the area (around the MTF) can be expected to return to the posture that existed there in 1960." Holman further commented that this economic reversal would not happen if "alternative employment opportunities were provided."[46]

Webb, not wanting to lose the support of Stennis in the Congress, began to make plans to assist in the search for other MTF missions. The Senator wrote Webb following a spring meeting and requested that monthly meetings be set up to evaluate the "serious" situation at the MTF. Somewhat satisfied, Stennis released a statement to the press indicating that Webb had assured him NASA was "diligently searching" for other government business and work for the MTF.[47]

With the Stennis announcement and NASA's early success with an MTF-tested stage on the Saturn V vehicle—the Apollo 4 flight on 9 November 1967—spirits of the Balch organization were boosted. Work was apparently progressing well for the MTF on both of its fronts of endeavor: in the test complex and in its search for a new mission. Balch continued his correspondence with Stennis and added other important political friends to his cause. A close ally of Stennis, U.S. Representative William Meyers "Bill"

---

45. John C. Stennis to Jackson M. Balch, 15 March 1968, SSCHRC.

46. NASA-MTF Director's Office Files, "Significant Events, Changing Utilization," SSCHRC; James E. Webb to Jackson M. Balch, SSCHRC; Dr. Mary Holman, "Economic Impact Study," 1968, SSCHRC.

47. John C. Stennis to James E. Webb, 19 July 1968, SSCHRC. Letter requesting Harry Finger, NASA Headquarters, meet monthly with Bill Spell of Stennis's office to evaluate the "serious" situation at the MTF.

Colmer (1890–1980), a Democrat from nearby Pascagoula, Mississippi, became familiar with Balch's campaign and began helping in the House of Representatives. Colmer added an important voice because of his position as chairman of the powerful Rules Committee. In that office, Colmer was able to set the legislative agenda of the House of Representatives.[48]

Another political friend who came to Balch's aid was Mississippi Governor John Bell Williams (1919–1983), who took office on 16 January 1968. Williams was a member of the U.S. House of Representatives from 1946 to 1967. As Governor, he made use of his experiences and friendships to encourage the MTF's future. After taking office, Williams launched an ambitious program through the state legislature. His administration is credited with phenomenal growth in business, commerce, and manufacturing, unequalled in any other period in the state's history.[49]

Balch's plans for new programs at the MTF fit perfectly into Williams's own economic schemes for the state of Mississippi, and they developed a special relationship, becoming friends. Williams appreciated the technical expertise of NASA and became a "space buff," visiting the MTF to view static firings and traveling to Florida to see Saturn launches.[50]

Van King, acting on behalf of Balch, was the first MTF staff member to get Governor Williams's attention; consequently, King was responsible for bringing a major oceanographic program to Mississippi. He was studying the U.S. scientific market, looking for future MTF projects, when he began to realize the country seemed infatuated with the study of oceanography. He felt that the MTF, located on navigable water leading to the Gulf, had the potential to host agencies and programs involved in oceanography. When Williams was elected Governor, King solicited the help of Mack Herring, PAO, to gain an introduction to the Governor.[51]

---

48. William Meyers Colmer, *Biographical Directory Of The United States Congress, 1774–1989* (Washington, DC: U.S. Government Printing Office, 1989) p. 811; *The Almanac Of American Politics*, p. 424.
49. Cecil L. Sumners, *The Governors Of Mississippi* (Gretna, LA: Pelican Publishing Company, 1980), pp. 136–138; Ann Westendorf, interview by Mack Herring, Huntsville, AL, 31 August 1995.
50. *Ibid.*
51. King, interview; E.G. "Glade" Woods, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 435, 1993, pp. 7–8, SSCHRC; For further information regarding Colmer's connection to the MTF, see the *William Colmer Papers* (1963–1970), McCain Archives, University of Southern Mississippi, 2nd accession, boxes 100, 109, 117, 127, 139, 150, 205, 206.

Working through Williams's public relations officer, King and Herring drafted suggested remarks, with an emphasis on oceanography, for Williams to consider in his inaugural address. The remarks were extremely bold for a new venture, with a statement of intention that said an effort should be made to "establish the state of Mississippi as a front line contender with California and Florida as the leader in oceanography from the standpoint of biological science, deep-water submersion, and to back this capability with the technology in the new market." The draft remarks also suggested that the Governor form an advisory group on "oceanography, geological industries, and environmental sciences." Although Williams did not use much of the material in his address, the thought was planted in his mind, and he did take action, along with the MTF, in implementing many of the suggestions. The move to bring Williams closer to the MTF paid off as Balch's search continued.[52]

BOMEX

Van King's belief that oceanography held promise for the MTF proved to be right on target in 1968 when he discovered that a former MSFC boss and associate was organizing a major oceanographic study in the Atlantic Ocean. Dr. Joachim P. Kuettner of the Environmental Science Services Administration (ESSA) was former chief of the MSFC Saturn Projects Office, where King served as his deputy before joining Balch at the MTF. Kuettner was named by ESSA as director of a large-scale oceanographic and meteorological experiment called Barbados Oceanographic and Meteorological Experiment (BOMEX). The experiment was the most intensive scientific investigation over a large ocean area ever undertaken. BOMEX served as a pilot project to provide better understanding of the world's atmosphere and oceans, concentrating on the interaction of air-sea energies in the oceans.[53]

---

52. "Governor Williams Dies," *The Jackson (MS) Daily News*, 27 March 1983; King, interview; E.W. King, Jackson Balch, and Mack Herring, "Mississippi's New Frontier," draft remarks for Governor John Bell Williams's inaugural address, January 1968.
53. Ben Davidson, "The Barbados Oceanographic And Meteorological Experiment," *Bulletin Of The American Meteorological Society*, vol. 49, no. 9, September 1968. See Swenson, Grimwood, and Alexander, *This New Ocean*, for good biography of Joachim P. Kuettner, Van King's mentor, Wernher von Braun associate, and scientific director of BOMEX, pp. 171–172.

King approached his long-time associate and friend, Kuettner, who was looking for a competent hardware agency to provide logistics and data reduction for the massive multidiscipline project. With Balch's blessings, King was able to offer experienced data specialists and use of the MTF's vast data services and facilities. Because of King's previous work with Kuettner at the MSFC, the new partnership was initiated with a high degree of trust. The MTF was given the task to design, install, maintain, and operate a computerized data management system for BOMEX. Balch immediately appointed King as BOMEX project manager. GE, with its expertise in data systems and data reduction, was given the contract to provide the data systems. The initial announcement was made 24 October 1968, launching the MTF on its first significant new mission and giving it a "foot in the door" in the scientific world of oceanography.[54]

Apollo Journey Begins

While part of the MTF was gearing up for its role in BOMEX, the rocket test teams began seeing their work come to fruition with Apollo/Saturn V flights into space. The first unmanned Saturn V flight, Apollo 4 (AS-501), took place 9 November 1967. That flight was followed by another unmanned mission, Apollo 6 on 4 April 1968. The first manned Apollo mission came on 11 October 1968, when the orbital flight of Apollo 7 proved the reliability of a spacecraft that had undergone major redesign and modifications since the tragic fire of Apollo 1 on 27 January 1967. Astronauts Walter M. Schirra, Don F. Eisele, and Walter Cunningham became the first Americans to fly in the new craft. These flights provided satisfaction and confidence for thousands of Americans involved in the Apollo program since its inception in 1961.[55]

NASA went through months of study and serious deliberations before a decision was made to go "all up" and send astronauts on the Apollo/Saturn V

---

54. NASA-MTF News Release, 24 October 1968, SSCHRC; NASA-MTF News Release, 15 November 1968, SSCHRC.

55. Cortright, ed., *Apollo Expeditions To The Moon:* Wernher von Braun, "Saturn The Giant," p. 55; George M. Low, "The Spaceships;" Al Hall, *Man In Space*, vol. 3, pp. 96–144; "MSFC Role in Orbital Operations—Agenda: Items for Discussion, Technical Staff Meeting," *Daily Journal of Dr. Wernher Von Braun*, 13 December 1961.

vehicle's first flight to orbit the Moon. Although the Apollo 8 mission was planned as a lunar-orbital flight only, the mission was considered a giant step toward a lunar landing. The flight called for all rocket stages, the spacecraft, and the Earth support systems to work together for the first time. Although there were problems encountered on the flight of Apollo 6 (AS-502), results of the MTF static test-firings of the rocket stages used for Saturn V provided the necessary confidence for this first manned flight of the Apollo 8 vehicle.[56]

Indeed, the MTF test crews watched the proceedings at Cape Kennedy closely. They felt their reputations were at stake when the countdown for the Apollo 8 mission began on 15 December 1968 as electrical power began flowing into the giant Saturn AS-503 vehicle. About 200 members of the launch team began going over their checklists in the firing room. A million gallons of liquid oxygen, liquid hydrogen, and other propellants were pumped aboard. Astronauts Frank Borman, James A. Lovell, Jr., and William A. Anders entered the command module, and the hatch was closed at 5:34 a.m. on 21 December. They were ready, and the world was watching as the final minutes ticked down to liftoff.[57]

Balch, accompanied by Terry Malone, senior photographer and protocol officer, traveled to Florida to witness the launch. Malone remembers that dawn was breaking when the mighty Saturn V roared to life at 7:51 a.m., and seconds later was thundering past the service tower. Shock waves reverberated across the sandy, palmetto beaches as the 365-foot-tall space vehicle left the launch pad and began its roll program to escape the Earth's atmosphere. "I saw all of the Saturn V launches," Malone said, "but none were [*sic*] as beautiful as Apollo 8." The first- and second-stage rockets tested at the MTF performed flawlessly during the ascent phase of the mission, placing the Apollo crew in parking orbit around the Earth. During the second orbit, CapCom Mike Collins (at the Houston Control Center at Johnson Space Center) gave the command, "you are go for TLI [translunar injection]." Lovell calmly said, "Ignition," and the S-IV-B ignited for its second burn, sending the Apollo 8 crew on their way to the Moon. The crew

56. Roger D. Launius, *NASA: A History of the U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Company, 1994), pp. 89–90, 207–210.

57. Henry C. Dethloff, *Suddenly Tomorrow Came. . .* (Washington, DC: NASA SP-4307, 1993), pp. 171–173.

remembered that the mission was like embarking on a "journey to God's workshop." At 4:59 a.m. on Christmas Eve, Apollo 8 entered an elliptical orbit around the Moon.[58]

While in orbit, the crew of Apollo 8 performed a number of technical experiments, but perhaps what they did in their "spare time" had the most far-reaching effects on the people at home on planet Earth. During a telecast on Christmas Eve, astronaut Lovell described the Earth as a beautiful, fragile ball. They captured black-and-white television pictures of the famous scene of the Earth rising across the lunar landscape. In contrast to the bluish-white colors of the Earth, astronaut Lovell said, "The vast loneliness is awe-inspiring, and it makes you realize just what you have back there on Earth." Color photographs of the "Earthrise" brought back by the crew became a symbol of the growing worldwide environmental movement.[59]

The scenes televised to an estimated half-billion people aroused great wonder, giving people on Earth an opportunity to vicariously explore what no one had ever seen before. Before going off the air, astronaut Bill Anders began sending a Christmas message to the people on Earth when he said, "In the beginning God created the Heaven and the Earth." At the conclusion of the biblical creation story, Commander Borman added, "And from the crew of Apollo 8, we close with good night, good luck, a Merry Christmas, and God bless all of you—all of you on the good Earth."[60]

Jackson Balch witnessed the launch and returned from Cape Kennedy to follow the mission at his Southern colonial home nestled under huge live oaks on the beach at Pass Christian, Mississippi. Balch released a message to the local press stating "It is hard for us who have worked so closely to this fascinating program for so many years to really comprehend just what Apollo 8 means now, or what it will mean in generations to come. But one thing is for sure. We are all very humble to have had a part in such a prominent moment in the history of man." Balch thanked the people of the Mississippi Gulf Coast for their support, referring to them as "part of the team."[61]

---

58. Roger E. Bilstein, *Orders of Magnitude, A History of the NACA and NASA, 1915–1990* (Washington, DC: NASA SP-4408, 1983), pp. 88–91.

59. John Barbour, *Footprints On The Moon* (USA: American Book-Stratford Press, Inc., 1969), pp. 139–155; Peter Ryan, *The Invasion Of The Moon, The Story Of Apollo 11* (Middlesex, England: Penguin Books Ltd., 1969), pp. 33–34.

60. Hall, *Man In Space*, vol. 2, pp. 40–57; Barbour, *Footprints On The Moon*, pp. 139–155.

61. Jackson Balch, "Flight To The Moon Truly The Efforts Of Thousands," *The Daily Herald*, 31 December 1968.

On Earth And Sea

With spirits high after the huge success of Apollo 8, Balch and his team approached the new year (1969) with great optimism. After all, the MTF had its "plate full" with continued testing of Saturn V rocket stages and preparations for its scientific role in the BOMEX project. In March, the MTF hosted a number of U.S. scientists from government, industry, and the academic community to discuss experiments that would be conducted as part of BOMEX. Since BOMEX was the largest geophysical experiment ever conducted in terms of data collected, the project drew some of the most noted scientists to the MTF conference. They included Dr. Kuettner, BOMEX director; Dr. Joshua Holland, chief scientist for Air-Sea Interaction Experiments; Dr. Robert Fleagle, chairman of the National Academy of Science; Dr. Arnold Glaser, BOMEX scientific coordinator; and William Maloney, Naval Oceanographic Projects scientific coordinator. BOMEX was indeed what Van King envisioned when he brought the project to Balch's attention—an opportunity to display the MTF to the nation's most prominent and influential scientists. In addition, Balch was assured that the MTF would get its share of credit when given the assignment to handle public information for the program. As the BOMEX project progressed, Balch made many contacts in the worlds of oceanography and environmental science; many later took up residence at the MTF for permanent studies.[62]

As the time neared for the start of BOMEX, the MTF organization for the project began to take shape. Working with GE and other NASA-MTF elements, King recruited a number of qualified personnel. Balch assigned three of his best technical personnel to assist King: E.G. "Glade" Woods, Alex Peresich, and Dan Blenis. All three were engineers in the Saturn V Test Complex. Paul T. Mowery, manager of the MTF data processing and handling facilities, was named by GE to head the company's support effort—about 50 engineers and technicians.[63]

Governor Williams, cognizant of the possibility of future business in oceanographic research, worked with the MTF and BOMEX in a number of ways. With the Governor's unqualified support, King arranged for the state

62. NASA-MTF News Release, "News From BOMEX," 27 March 1969, SSCHRC.

63. NASA-MTF News Release, 15 November 1968, SSCHRC; GE MTSD News Release, 22 October 1968, SSCHRC.



Glade Woods, NASA's Barbados Oceanographic and Meteorological Experiment (BOMEX) field manager, left, and Wayne Masters, GE, check out the BOMEX Data Acquisition System (data logger) designed at the Mississippi Test Facility (MTF) to record data from sensor inputs during the landmark multiagency project conducted in 1969. (SSC-69-5811)

port at Gulfport to be the staging area for installation of data acquisition equipment for five BOMEX scientific vessels. The nearby Navy Seabee Center in Gulfport was used to store equipment and furnish logistical support for the vessels.[64]

Even more news came when Mississippi State University announced that NASA had awarded the institution a $300,000 grant for space and environmental studies to be performed on campus and at the MTF. All of this pleased Stennis, who commented that BOMEX was a forerunner to even larger ocean projects from which the entire state and its universities would benefit. As predicted by Van King, BOMEX had its intended result—the MTF had found at least one new mission.[65]

With many MTF personnel scattered over 90,000 square miles of the Atlantic Ocean gathering data for BOMEX, space engineers on shore turned their eyes to the east coast of Florida and the NASA launch facility—Cape Kennedy. There, on 16 July 1969 at Launch Complex 39, stood the giant

64. "Oceanography Conference In State April 10," *The Daily Herald*, 27 March 1969; "NASA Makes MSU Research Grants," *The Natchez (MS) Democrat*; "Gulfport Seabees Store Material For BOMEX," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*); Editorial, "Ocean Research Program Offers Vast Potential For Mississippi," *The Clarion-Ledger*, 14 April 1969.

65. "Mayor, Governor Authorize Holiday," *The Clarion-Ledger*, 18 July 1969; Malone, interview; Hall, *Man In Space*, vol. 2, pp. 124–129.

Apollo/Saturn V vehicle that thousands of NASA colleagues built and tested for humankind's most daring exploration—a manned landing on the Moon. Among the 6,000 invited guests and over one million public visitors present to witness the grand event along Florida's white sandy beaches, were Jackson Balch and a number of his employees and community friends. Many of the MTF personnel took leave from their jobs and drove their families the 600 miles to Cape Kennedy to see the launch. Others joined friends and neighbors and watched the spectacle on television at their homes.[66]

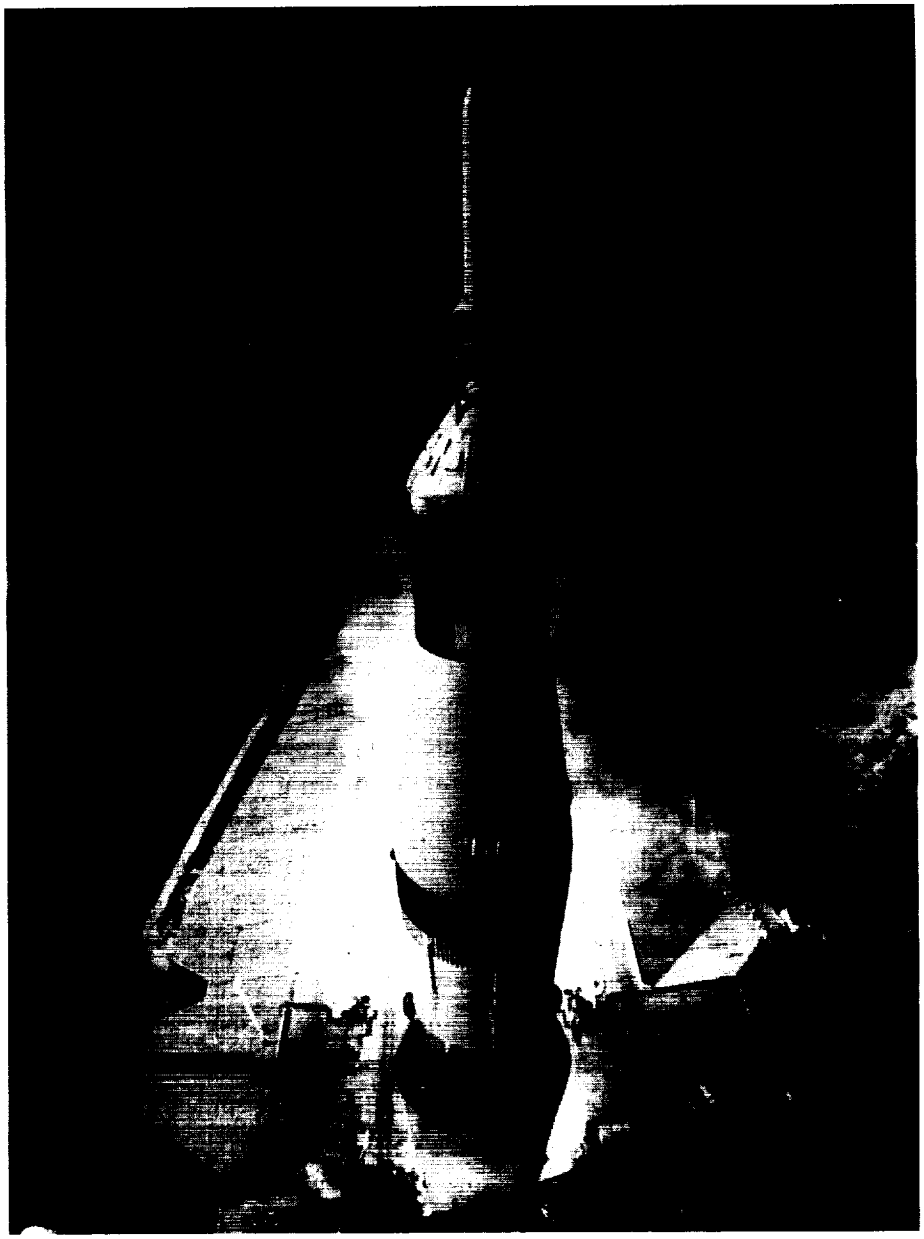
The day of the launch, all eyes were riveted on the gleaming 365-foot-tall, white Saturn V rocket. Atop the 36-story space vehicle were three astronauts: Neil Armstrong, Edwin Aldrin, and Michael Collins. Armstrong described their feelings, "As we ascended in the elevator to the top of the Saturn that morning, we knew that hundreds of thousands of Americans had given their best effort to give us this chance. Now it was time for us to give our best." Armstrong's remarks were illustrative of the appreciation felt by the astronauts toward the men and women who prepared the vehicles for their flights.[67]

Apollo 11 lifted off for the Moon in classic style at 9:32 a.m., just milliseconds past its scheduled time. After the launch, Balch said, "Nothing less than perfection could have launched Apollo 11 on its history-making voyage with such flawless precision. The dramatic flight is especially significant to all of us because two of the major elements of the Saturn V vehicle—the S-IC and the S-II stages—were checked out and proven flightworthy at the MTF." Four days later the astronauts were circling the Moon in the command module *Columbia*. Armstrong and Aldrin entered the lunar module *Eagle*, and a few minutes later Armstrong announced, "The *Eagle* has wings," and he began his descent to the Moon's surface.[68]

The lunar landing provided high drama unequaled in the history of flight. People all over the world listened as the astronauts descended to the surface. *Eagle* skimmed across a cluster of large boulders, and its spidery legs seemed to reach out and trip over the obstacles. In the *Eagle*'s cramped cabin, Armstrong steered the lunar module toward an open, flat patch of moonscape, while Aldrin called out velocities and heights as surface dust swirled into

---

66. John Noble Wilford, "Apollo 11: On The Moon," *Look Magazine*, 1969, unnumbered pages.
67. *Ibid.*
68. *Ibid.*



On 16 July 1969, American astronauts Neil Armstrong, Edwin "Buzz" Aldrin, and Michael Collins lift off from the Kennedy Space Center atop the mammoth Saturn V rocket on their way to the Moon during the Apollo 11 mission. Apollo/Saturn V booster stages were tested and certified for flight at Mississippi Test Facility. (SSC-94- 202-8)

view. At 4:17:40 p.m., 20 July 1969, the *Eagle* dropped five feet in a one-sixth-gravity free fall, and its four talons touched the lunar surface. A blue "lunar contact" light came on in the cabin, while at Mission Control in Houston there was total silence. Then, Armstrong's calm, testpilot's voice came over the radio monitors, "Houston, Tranquility Base here, the *Eagle* has landed." The fuel gauge on the console showed 20 seconds of fuel left in the *Eagle*'s tanks.[69]

A few hours later, at 10:56:19 p.m., Armstrong cautiously placed his foot on the Moon as he stepped off the lunar module and said, "That's one small step for man, one giant leap for mankind."[70]

Back on Earth, the MTF employees and their neighbors followed the lunar expedition on television and celebrated the victory they shared with the astronauts on the Moon. Bob Bush, Saturn S-II manager, invited a number of his friends and fellow workers to share the experience. Among those at the Bush residence were A.J. "Jack" Rogers, Jr., Harry Guin, and Mike Myers, all major contributors to the testing and flight certification of the Saturn V launch vehicle. As the night wore on, the MTF crew even wrote their own tribute to Apollo 11 in the form of a poem that chronicled their exploits at the MTF while testing Saturn. The next day, upon "sober" reflection of their literary work, the Mississippi crew declared that the poem was not ready for publication.[71]

From The Gulf: An Ill Wind

The astronauts emerged from their quarantine, after returning to Earth, to a "Salute to the Team" luncheon celebration at the Rice Hotel in Houston, Texas. The 14 August 1969 luncheon preceded planned parades, banquets, and other celebrations in New York, Chicago, Los Angeles, and Washington, D.C. The Houston affair was requested by the crew for the NASA and contractor employees and was attended by 750 people. Frank Borman, Apollo 8 commander, served as master of ceremonies. NASA Administrator Thomas Paine, Wernher von Braun, Robert Gilruth, Kurt Debus, George Mueller, Sam

---

69. *Ibid.*
70. *Ibid.*; Barbour, *Footprints On The Moon*, pp. 204–205; Michael Collins, *Liftoff. The Story Of America's Adventure In Space* (New York: Grove Press, 1988), p. 8.
71. Robert "Bob" Bush, "30th Anniversary History Roundtable," SSC video history, 25 October 1991, SSCHRC.

Phillips, and other space notables were there to help the Apollo 11 crew honor the team responsible for the successful mission. Several contractor employees from the MTF attended the celebration.[72]

At the same time, an ominous weather system was developing in the Caribbean Sea; it was first noted in the MTF Hurricane Log on Friday, 15 August 1969, at 5:00 a.m. The storm was 20.8 degrees N and 83.7 W, with a windspeed of 65 miles per hour, and it was named Camille by the Hurricane Center in Miami. Gene Burke, MTF's safety officer, declared "Condition IV" at 9:20 a.m. and initiated the early preparations called for in the site's emergency plan. By Sunday morning, 17 August at 9:00 a.m., the hurricane was 200 miles southeast of New Orleans with windspeeds of 160 miles per hour—making the storm a category 5 hurricane. The MTF emergency crews were working as fast as they could, securing the hydrogen and oxygen barges and tying down loose objects. A steady stream of evacuees from the Gulf Coast began arriving at the MTF's south gate, seeking shelter from the approaching hurricane.[73]

By 10:00 p.m. Sunday, 1,063 evacuees were registered with Bud Lovell, GE emergency coordinator; they were bedded down in the empty offices and hallways of Building 1100. At 11:05 p.m. Hurricane Camille roared ashore, with its eye passing over the Bay of St. Louis. The MTF employees, who did not evacuate the Gulf Coast, described the evening hours in nightmarish fashion, with stories of howling winds, tearing lumber, flying bricks, and rushing, thunderous waves of seawater crashing down on their homes. All communications to and from the Gulf Coast were blown out by the 200-mile-per-hour winds or washed away by a terrifying 27-foot tidal wave.[74]

The NASA and contractor MTF employees watched for dawn to see what wrath Camille wrought to their homes and to family members who "rode out" the hurricane along the Mississippi Gulf Coast. Jackson Balch brought most of his family to the MTF for safety, while he remained at home in Pass Christian with two sons in order to protect his property. The morning after Camille, Balch and his sons crawled through the rubble of their once beautiful home and made their way over a mountain of debris

72. Edwin E. "Buzz" Aldrin, *Return To Earth* (New York: Bantam Books, 1974), pp. 25–51.
73. NASA-MTF Emergency Coordinator, "Hurricane Log: Camille," 15–18 August 1969, SSCHRC.
74. Jackson Balch to Howard Slayden, "MTF Activities Related to Hurricane Camille," 18 September 1969.

piled high on the bridge that crossed the now placid Bay of St. Louis. On the west side of the bridge, they made their way down Highway 90 toward the NASA test site.[75]

75. Reporters of *The (Biloxi/Gulfport, MS) Daily Herald*, "The Story of Hurricane Camille" (Gulfport, MS: Gulf Publishing Company, 1969); John C. Tullett, *Camille* (Biloxi, MS: Loma Enterprises, 1969). Jackson Balch told author of experiences during the night of 17 August and early morning hours of 18 August 1969. Many other employees related stories to the author of instances of injury, damage, and death suffered in their families as a result of Camille. In fact, the author's home in Long Beach, MS, was demolished.

CHAPTER 8

Growing Pains

Recovery

The morning after Hurricane Camille, Mississippi Test Facility (MTF) employees opened their eyes and saw that their worst nightmares had come true. But the wreckage of the killer storm could not dampen their spirits. And Jackson Balch and his crew continued to reach for the "impossible dream" of securing the future of the MTF, while helping local citizens recover from the hurricane. Before the fruits of their labors were realized, however, the NASA crew and their community friends had to win the fight of their lives and suffer growing pains of great proportions as their empty office and laboratory spaces were filled with new and unfamiliar residents.[1]

Indeed, Balch's optimistic observation, "It's an ill-wind that blows no good," had a ring of truth. Help came from all quarters to lift the NASA employees and their Gulf Coast neighbors out of the 26-mile-long pile of debris. The bond between the NASA-MTF employees and local citizens

1. Staff, *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), "The Story Of Camille" (Gulport, MS: Gulf Publishing Company, 1969); E.W. "Van" King, interview by Mack Herring, Pass Christian, MS, 9 November 1995; Janet Balch, interview by Mack Herring, Pass Christian, MS, 9 November 1995, Stennis Space Center Historical Records Collection, Stennis Space Center, MS (henceforth referred to as SSCHRC).

strengthened as everyone worked together to rebuild their Gulf Coast communities and find new missions for the ailing test site.[2]

Camille Recovery

As the recovery process got under way, Gulf Coast residents looked to NASA, with its technology, expertise, and facilities, to help guide the recovery process. Senator John C. Stennis, Governor John B. Williams, Wernher von Braun, NASA Administrator Thomas Paine, and even President Richard M. Nixon (1913–1994) looked to Balch and the MTF organization to lead the way. Although a large number of the MTF government and contractor workers suffered severe losses, even deaths in their families, their proven expertise qualified them to oversee the rebuilding on the Coast.[3]

At dawn on 18 August 1969, when he came out of his Pass Christian home, Balch could see the extent of the hurricane damage. Balch stated, "...I could see the awesome destruction surrounding what was left of my home. Other homes, belonging to neighbors, were completely gone. I immediately started searching and found that many had lost their lives." Just a few blocks from his shattered residence, Balch discovered that 29 residents died during the total destruction of the Richelieu Apartments. Balch remembered that by midmorning no help came, nor was any apparently forthcoming. He decided the only help available was at the NASA-MTF. Walking about two miles to the Bay of St. Louis bridge, he climbed over the "mountain of debris" left by the 27-foot tidal wave. On the west (Bay St. Louis) side of the bridge, he borrowed a car and drove 24 miles to the MTF for help.[4]

---

2. "Marshall Center Donates $35,744," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*), 12 September 1969; "Dr. Debus Thanks Spaceport Employees For Camille Help," *Spaceport News*, 11 September 1969; "President Nixon Praises MTF Employees For Efforts," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*) 30 October 1969.

3. Special Task Force Of The Office of Emergency Preparedness and The Mississippi R&D Center, "Recovery Of The Mississippi Gulf Coast, A Special Report," Gulfport, MS, 5 December 1969, SSCHRC.

4. Janie Jones, MTF Public Affairs Office, "Hurricane Camille And Aftermath," unpublished papers drafted immediately after Hurricane Camille, 18–26 August 1969, SSCHRC; Janet Balch, interview; E.W. "Van" King, interview; Jackson Balch, transcript, "Testimony To Special Committee On Disaster Relief, Senate Committee On Public Works, 7–8 January 1969, SSCHRC. For additional information, specifically photographic information, regarding condition of the Mississippi Gulf Coast following the hurricane, see *"Camille," A Hurricane, August 17–18, 1969* (Biloxi, MS: Graphic Press, 1969).



This scene of destruction was typical of the damage left by Hurricane Camille when it ravaged the Mississippi Gulf Coast in August 1969. The eye of the storm passed directly over the Bay of St. Louis and killed or injured hundreds of Gulf Coast residents. (SSC-97-032)

Balch arrived at the site at approximately 2:30 p.m. and immediately called Wernher von Braun. He described the disaster in graphic detail, and he told von Braun the devastation on the Gulf Coast was much like that suffered by German cities following massive Allied bombing raids in World War II. Von Braun stayed up all that night, helping pack one of the first truckloads of emergency equipment for the people on the Gulf Coast.[5]

Using NASA security vehicles, Balch led a caravan with supplies, such as water, medical equipment, and basic personal items, to the west end of the Bay of St. Louis bridge, which was impassable by vehicle. Balch and his helpers then carried the heavy, 10-gallon jugs of water and other supplies to the east end (Pass Christian side) of the bridge for distribution. The arduous path over the debris, piled several feet high, was difficult and dangerous. Balch then took Wayne Mooneyhan, Roy Estess, and others on an assessment

5. *Ibid.*; Janet Balch, interview.

survey of the area. The MTF group, however, first held a planning session during which Balch named Wayne Mooneyhan his deputy for the ravaged Pass Christian community. Balch then gave Roy Estess the job of caring for the refugees. He appointed other MTF employees to handle the clearing of streets and distribution of food, clothing, and other supplies.[6]

Balch mobilized his entire workforce to assist the Gulf Coast communities. Once the community assistance groups were functioning, Balch organized the MTF Camille Recovery Task Force, which had the primary purpose of attending to the needs of the MTF employee victims of the hurricane. The task force included government and contractor managers, who were responsible for providing the MTF personnel with housing, schooling, counseling, household goods, transportation, and community support. Of the total number of MTF employees, seven either lost their lives or suffered a death in the family; 632 had extensive or total property loss; and 440 required emergency financial aid. The estimated property loss to the MTF employees was $7.6 million.[7]

The MTF task force worked around the clock in Waveland, Bay St. Louis, Pass Christian, and Long Beach. The MTF served as a communications center for the entire Mississippi coast because 90 percent of the communications lines were down. Hundreds of MTF employees reported to work and volunteered for the disaster relief work crews. Dr. Jim Howell, MTF medical director, worked long hours with his staff during the week following Camille, treating 1,748 employees and evacuees. Ted LaMunyon later observed that Balch's emergency organization did a "remarkable job."[8]

Governor Williams declared martial law for the entire Mississippi Gulf Coast, an order that included all aspects of the government, except the court system. He quickly formed the Governor's Emergency Council (GEC), an agency responsible for overseeing all forms of federal, state, and local assistance. Recognizing the expertise and facilities available at the MTF, Williams called on Balch and his workers to continue their critical role in the recovery

---

6. Jones, MTF-PAO "Hurricane Camille Aftermath."

7. *Ibid.*; For complete statistical account of property damage caused by Camille, see *Report on Hurricane Camille, 14–22 August 1969* (Mobile, AL: United States Army Engineer District, Mobile, Corps of Engineers, 1969); and R.D. Dikker, R.D. Marshall, and H.C.S. Thompson, *Hurricane Camille, August 1969* (Washington, DC: Bureau of Standards, 1971).

8. Etheridge, "Least We Forget," MTSD *Booster* newsletter.

operations. Later, GEC formalized the request in a resolution. The GEC resolution requested that the MTF "provide planning, coordinating, and review of projects and actions related to the recovery, rehabilitation, and future development of the Gulf Coast." And, furthermore, the resolution asked Governor Williams to request the President of the United States to assign the MTF the job of helping oversee the recovery. As a result, the MTF was given the assignment in coordination with the GEC by President Nixon.[9]

The MTF was not alone as it faced the crisis after Camille. Help poured in from sister NASA installations, from NASA Headquarters, and from contractor corporate organizations. Kennedy Space Center (KSC) employees sent three truckloads of food and clothing and $1,200 for the MTF employees. Marshall Space Flight Center (MSFC) employees raised $35,744 to help NASA-MTF workers, with von Braun personally organizing the fund-raising drive.[10]



Henry Auter briefs visiting astronauts John Young (left) and Charles Duke (center) high atop the S-1C test stand during their 1969 "morale boosting" visit to the Mississippi Test Facility (MTF) shortly after Hurricane Camille. The astronauts were among many notables who came to help and cheer up the workforce and their community neighbors after the hurricane struck 17 August 1969.

National leaders arrived on the Gulf Coast to offer their moral support to Camille's victims. The President flew into Gulfport on Air Force One and met with Governor Williams and the entire Mississippi congressional delegation. Nixon promised that the nation would support the recovery effort and predicted "that the people of Mississippi, particularly in the area of great

9. Special Task Force of the Office of Emergency Preparedness, "Recovery of the Mississippi Gulf Coast," 5 December 1969.

10. "KSC Quick Aid," *The Marshall (MSFC) Star*, 10 September 1969; "Marshall Center Raises $35,000," *The Daily Herald*, 10 September 1969.

devastation, will come up from this destruction. You will rise from it and be a greater people than before."[11]

As communications lines were re-established across the 28-mile stretch of destruction, sad statistics grew in the coastal counties. The number of dead reached 144, with 27 people missing, and 541 seriously injured. Damaged or destroyed were 36,362 homes and 693 businesses, and the estimated damage total reached $1.2 billion.[12]

The unselfish and dedicated work of the MTF employees brought words of grateful appreciation from the President and the NASA Headquarters bosses. Nixon, in a letter to NASA Administrator Paine, expressed his appreciation of the MTF employees. "The record of what has been done is one which the entire nation greatly admires and deeply appreciates," Nixon said. Astronauts John Young and Charles Duke came to the MTF to thank the workers for their attention to the space mission, even while recovering from losses that the hurricane incurred.[13]

A Blow From Huntsville

While the MTF employees were still recovering from the hurricane, the MSFC managers announced on 28 September 1969 that future Saturn V static tests at the MTF would be eliminated "because of dwindling budgets and to make way for advanced programs." The announcement was made following a 2-1/2-hour MSFC "administrative" meeting and was made public in *The Huntsville (Alabama) Times*. William Tier, MSFC deputy director for program management, said that NASA was eliminating static firings in an effort to "push the Saturn V program away from research and development toward a 'production mode'."[14]

---

11. "NASA Officials In Storm Damage Inspection Trip," *The Huntsville (AL) News*; Staff, *The Story Of Camille*, 1969.
12. *Ibid*.; Etheridge, "Least We Forget," MTSD *Booster*.
13. "President Nixon Praises MTF Employees For Efforts," *The Sea Coast Echo*, 30 October 1969; "NASA Officials in Storm Damage Inspection Trip," *The Huntsville (AL) News*, 2 November 1969.
14. Jack Hartsfield, "Launch Would Be First Firing, Saturn Testing To End," *The Huntsville (AL) Times*, 28 September 1969; Henry C. Dethloff, *Suddenly Tomorrow Came. . . A History Of The Johnson Space Center* (Washington, DC: NASA SP-4307, 1993), pp. 195–197.

The announcement shocked and angered Senator Stennis, the MTF personnel, and local community leaders. Most found the decision "uncaring and irresponsible" in the wake of the Camille tragedy. The untimely news proved embarrassing for Stennis, President Nixon, and NASA Administrator Paine, who had just pledged future assistance for the MTF and Gulf Coast communities. Before von Braun and Paine could be reached for comment, the news was quickly spread by Mississippi and Louisiana newspapers. *The (New Orleans) Times-Picayune* carried a headline that read "Mississippi Facility May Be Erased—Space Engineers Feel It Is No Longer Needed." Other newspapers ran headlines that read "Future of Hancock Test Facility Eyed," "MTF May Be Closed Says Paper," and "NASA To Abandon Facility." Senator Stennis was placed in an awkward position with his constituency, and President Nixon and high-ranking NASA officials seemed to be portrayed as "callous and insensitive."[15]

The MSFC announcement that the MTF would be "erased" hit the streets while Jackson Balch and Van King were dining with Bill Spell, Senator Stennis's aide, at a Washington, D.C., restaurant. King said they were all "shocked" as they heard the news. Balch had just finished observing that NASA "would not close [the] MTF in the face of Camille." Stennis reacted to the news by issuing a strong statement the following day, 29 September 1969, discounting the report that the MTF would be closed. He said that activity would continue on a "high level."[16]

Balch's early work in contacting other federal and state agencies in an effort to attract them to the MTF gave Stennis some ammunition to answer the negative news of a possible closing of the test site. Stennis said in his statement that the MTF "would not only operate as part of the space program, but that other programs from other federal agencies are certain to be located [at the MTF]." The Mississippi Senator stated that NASA Administrator Paine had assured the MTF employees and citizens of the Gulf Coast, immediately after Camille, that the MTF had a "long-term future." Paine told the MTF

---

15. "Mississippi Test Facility May Be Erased," *The (New Orleans, LA) Times-Picayune*, 28 September 1969; "Future of Hancock Test Facility," *The Daily Herald*, 29 September 1969; "MTF May Be Closed Says Paper," *The Enterprise (MS) Journal*, 29 September 1969; "NASA To Abandon Facility," *The West Point (MS) Times-Leader*, 29 September 1969.

16. *Ibid.*; John C. Stennis, "Statement Concerning Future Of MTF," 30 October 1969, SSCHRC; Thomas O. Paine, remarks after Camille, August 1969, SSCHRC.

employees during his August visit that a high-ranking group, comprised of the Secretary of Defense, Secretary of State, the President's science advisor, the Vice-President, and himself, was completing a report to present to the President. This report would hopefully cause discussions regarding future growth of the MTF and the Gulf Coast. "It is very clear to us that the Gulf Coast of Mississippi and this general area is not going to be abandoned," Paine had told the MTF employees.[17]

In an effort at "damage control," NASA issued positive stories in the Huntsville area about the MTF's future. B.J. Riche wrote in *The Birmingham (Alabama) News* on 8 October that NASA was laying out plans to ensure that MTF employees would keep their jobs "at least through the mid-1970s." Riche said that the MSFC officials were "considering ways to test-fire engines and stages of the proposed reusable Space Shuttle." The Riche story, however, pointed out a strong drawback to the MTF Space Shuttle proposition—Congress had not yet approved the funds for it. *The Birmingham News* article pointed out that NASA had invited other agencies to study the MTF to see if they could put their programs there. Only the Environmental Science Services Administration (ESSA), however, had made use of the facility.[18]

The controversy following the 28 September 1969 MSFC announcement that the MTF would be "erased" can now be seen as a "tempest in a teapot," but it did attract the swift attention of Senator Stennis, the President, and NASA Headquarters to the MTF plight. Why the possible closing of the MTF was discussed in such bleak times, immediately following Camille, is still not clear. Possibly, the individuals who made the statements were politically naive, or the tragedy of Camille had not yet registered with them. Nevertheless, the fracas was an omen of "things to come" and provided Balch with even keener insight into the ways the political power structure within NASA could and would be manipulated. Consequently, Balch set out to turn the future of the MTF around, since he seemed to have the support of some powerful allies.[19]

---

17. Stennis, "Statement Concerning Future of MTF"; Paine remarks.
18. B.J. Richey, "Space Agency Acting To Keep Jobs At MTF," 8 October 1969, SSCHRC; "MTF Set For New Testing," *The Huntsville (AL) Times*, 8 October 1969.
19. Roger D. Launius, *NASA: A History Of The U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Co., 1994), pp. 107–108.

A Strategy For The Future

After seeing the quick results his political friends could produce, Balch observed to his MTF colleagues that "the stars are right" to bring new resident agencies to the MTF. The Mississippi-Louisiana congressional delegations were among the most important in the nation. Stennis, his number-one ally, was now chairman of the Armed Services Committee and fourth-ranking member of the Aeronautical and Space Sciences Committee; Senator James O. Eastland, senior Senator from Mississippi, was chairman of the Judiciary Committee and third-ranking member of the Agriculture and Forestry Committee; and Representative William M. Colmer of Mississippi, Fifth Congressional District (home of the MTF), was chairman of the Rules Committee.[20]

In addition, to strong Mississippi support, Balch found an equally impressive congressional delegation across the Pearl River in Louisiana. The proximity and connection of the MTF to the Michoud Assembly Facility (MAF) in New Orleans and the Slidell Computer Complex provided major reasons for Louisiana congressional support. The strong Louisiana delegation included Senator Allen Ellender, chairman of the Appropriations Committee; Senator Russell Long, vice chairman of the Joint Committee On Revenue Taxation; Representative F. Edward Herbert, chairman of the House Armed Services Committee; and Representative Hale Boggs, the Democratic Whip.[21]

Although the powerful delegations of Mississippi and Louisiana provided sufficient congressional influence, Balch found another friend in U.S. Senator John L. McClellan, of Arkansas, chairman of the Government Operations Committee. In addition, Governor Dale Bumpers, also of Arkansas, was interested in joining his state's technical forces with the new MTF environmental movement. With Mississippi Governor John B. Williams and Louisiana Governor John J. McKeithen supportive of the MTF, Balch had political backing during his search for new missions. Thanks was in part due to the fact that both Mississippi and Louisiana had offices representing their universities and state governments located at the facility. Balch made sure his political friends were fully informed and aware of what the "new MTF" had to offer in eco-

---

20. Michael Barone, Grant Ujifusa, and Douglas Matthews, *The Almanac Of American Politics* (New York City: Gambit Publishing Co., 1972), pp. 297–312, 413–425.

21. *Ibid.*

nomic growth and jobs. The Mississippi, Louisiana, and Arkansas politicians who were connected to the MTF also had appreciation and admiration for Jackson Balch, a maverick who was, apparently, not afraid to go outside the bureaucratic chain of command to accomplish his idealistic mission.[22]

With powerful Democrats controlling key committees and the purse strings of Congress, President Nixon, a Republican who needed support for his programs, paid particular attention to the needs of the Balch group in Mississippi. And, to the chagrin of the MTF rivals at the MSFC and its skeptics at NASA Headquarters, the Mississippi outpost held one of the keys, through Stennis, to the funding success in the Congress of the Space Shuttle program.[23]

Before Hurricane Camille, Balch and his group sought new missions and new tenants in random fashion, with a basic concentration on agencies with interests similar to the MTF's own pursuits. Generally, Balch considered his thrust to be in the environmental and oceanographic disciplines. His strategy was to work, as much as possible, within the NASA structure, and not be prohibited from going outside the chain of command. Most of his "outside" efforts were through the office of Senator Stennis. After scoring some success immediately after Camille, and gaining recognition for the MTF's work in assisting the devastated communities, Balch began to develop a strategy to broaden his reach and influence.[24]

After Hurricane Camille, Balch became selective about the type of disciplines he wanted at the MTF. For instance, he developed a concept that satellite-based technology could be a panacea for oceanographic and environmental research. He believed the development of satellites was the most important contribution NASA made to the world of science. Lecturing his staff and potential tenants he would hold his hands up in a level position and graphically depict "satellites," claiming that, "The place to study the interactions of the weather, the oceans, and the land masses on Earth is from this new platform of space provided to us by the use of satellites. We can learn more

---

22. John Clements, *Taylor's Encyclopedia of Government Officials, Federal and State* (Dallas, TX: Political Research, Inc., 1969–1970), vol. II, pp. 59, 92–93, 106–107; Herman Glazier, interview by Mack Herring, SSC, November 1995, SSCHRC.

23. Launius, *NASA: A History Of The U.S. Civil Space Program*, pp. 104–105, 107; Bryce Harlow to John Stennis, 22 October 1969, SSCHRC.

24. King, interview; Edmund R. Gray and Herbert G. Hicks, "The Mississippi Test Facility: A Study In Organizational Viability," occasional papers, no. 4, May 1971, Division Of Research, College Of Business Administration, Louisiana State University, Baton Rouge, LA, pp. 39–51.

about our problems from this vantage point, looking down at the Earth from space." His concept of creating a utopia of scientists, working across disciplines, bureaucratic agencies, and state boundary lines covered practically every federal agency engaged in the study and regulation of space, Earth, and the oceans. His vision for the MTF appealed to "working" scientists and technical managers and made sense to the politicians who were dealing with shrinking federal budgets.[25]

Balch and his spunky team, comprised of a new breed of scientist/engineers, discovered an important phenomenon during their support of the Barbados Oceanographic Meteorological Experiment (BOMEX). The many scientific entities shared a common, technical weakness. They were fairly adept at acquiring data, but were unable to reduce the data into a format that could be analyzed and studied. When King, Estess, and other members of the MTF team began their marketing endeavors, they found this common weakness existed within technical agencies all across the country. This discovery offered the MTF the chance to "sell" its services and facilities to other agencies. After all, a major strength at the MTF was the ability to acquire thousands of bits of data from a rocket static firing and reduce the information to a format that could be studied to certify a rocket flightworthy. The proven track record of the MTF in the Apollo program was well known to potential customers looking for expertise and for facilities in which to conduct their research.[26]

Balch committed himself and his staff to a rigorous study of government manuals, almanacs, trade publications, congressional directories, and popular books and magazines. He also encouraged his "marketeers" to read advertisements in trade magazines to "get the flavor" of a particular science such as oceanography. He recommended such books as Rachel Carson's *The Silent Spring*, Alvin Toffler's *Future Shock*, and Desmond Morris's *The Naked Ape*. Part of his own reading diet was the encyclopedia, which he devoured with the same zest some readers have for a popular adventure novel. His goal was to turn "smoke and fire" rocket engineers into hybrid-type scientists of many disci-

25. Jackson Balch, briefing transcript, 14 November 1969, SSCHRC; Jackson Balch, interview by Gateway Productions, 10 December 1974, SSCHRC.

26. King, interview; NASA-MTF News Release, "BOMEX," 22 May 1969, SSCHRC; MTF Manager's Office, "MTF Management Plan For Evolving Mission," presented to Dr. George Low, 22 December 1970, SSCHRC.

plines. And, from the success of the small NASA-MTF element, approximately 100 people. Balch's "quick course" in relevant science seemed to pay off.[27]

Balch's practical planning efforts knew no bounds, as he reached out to some of the nation's foremost thinkers through GE, university study contracts, and government managers recommended by his political friends. The GE contract at the MTF was part of a much larger Apollo support effort, with strong ties back to the GE corporate offices and extensive, well-known laboratories. Through GE in the autumn of 1969, Balch was able to tap into the company's renowned think-tank Technical Military Planning Operation (TEMPO), which had a national reputation for technical planning and management research. Dr. Paine, NASA Administrator, was a former vice president of GE and was pleased that Balch secured a study contract with TEMPO that further focused a mission concept for the MTF. Balch later confided he was disappointed that Paine did not take a more active role in assisting the MTF in its endeavors.[28]

The GE TEMPO report proposed several alternative uses of the MTF (1) a nuclear power-generation complex, (2) an aviation-oriented complex, and (3) a co-located environmental sciences, education development, and metro-systems management support base. The first two alternatives had some merit, but the lead-time for their establishment was five to ten years. The Balch group felt the third recommended mission, the environmental complex, best fit with the MTF marketing group's own findings and the national need for coordination of the fragmented environmental efforts of government agencies and private activities. And, the MTF could pursue the environmental goal immediately.[29]

Finding few to assist him within the NASA leadership, Balch developed his own contacts in the scientific world. In the process, he cultivated relationships and even friendships with some of the nation's foremost scientists and technical managers. Balch corresponded and met with such notables as Dr. H. Guyford Stever, director, National Science Foundation; Dr. James Wakelin, chairman of the President's Commission on Oceanography; Dr.

---

27. King, interview.

28. GE Center for Advanced Studies at Santa Barbara, CA, "The Future Use Of NASA's Mississippi Test Facility: A Preliminary Study For Economic Growth," December 1969, SSCHRC.

29. *Ibid.*; NASA Administrator's Office, "A Proposal For Future Utilization Of MTF, 10 March 1969, SSCHRC. Copy also at the NASA Historical Reference Collection in Washington, DC (henceforth referred to as NHRC).

Robert M. White, administrator, Environmental Science Services Administration (later known as NOAA); Dr. George Kavanaugh, assistant general manager, Atomic Energy Commission; Dr. Edwin Shykind, director, President's Marine Science Council; Dr. James M. Sharp, president, Gulf Universities Research Corporation; Dr. P.T. Bankston, director, Mississippi Office of Science and Technology; and Robert S. Finley, director, Louisiana State Science Foundation.[30]

During the search for new business and missions, Balch used a system that allowed him to work outside the NASA chain of command, which greatly aggravated his bosses at the MSFC and the Headquarters. Once he found the proper person to contact, he would draft a letter for Stennis, Ellender, Colmer, or others and "introduce himself" through the politician. His political allies would sign the letter and forward it to the person Balch wanted to visit or contact. When Balch received an answer, he would take the correspondence to his NASA superiors and point out that "someone must react." After many embarrassments, NASA officials stopped accompanying Balch and let him and his staff go about their business.[31]

Balch's political connections, however, extended beyond simple letter writing. Many of Balch's closest associates at the MTF were able to exert unusual pressure on the MSFC and the Headquarters's officials. For example, King remembered one instance when he was briefing a Headquarters's official in Washington. King kept getting interrupted by an MSFC person who was sent to "monitor" his presentation. After awhile, King yelled "Shut up!" at the monitor. The Headquarters's officials chuckled and encouraged King to continue. On more than one occasion during meetings in Washington with the Administrator and other high-ranking NASA officials, Stennis put an arm around Balch's shoulders in an affectionate hug and said, "This is my man." The NASA leadership received the powerful Senator's message.[32]

With interest stimulated by BOMEX and contacts by Stennis, Balch, and his staff, some elements began showing an interest in the MTF toward the

---

30. See MTF Manager's office journal, "Significant Actions——Changing Utilization," to get a feel for the large number of high-ranking scientists and government officials Balch corresponded and met with from 1967–1975.

31. *Ibid.*, 1969; Gray and Hicks, "...A Study In Organizational Viability."

32. Ann Westendorf, interview; Roy Estess, interview by Henry Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 18 June 1991, p. 12, SSCHRC; Estess, interview.

end of 1969. They included the Bureau of Commercial Fisheries, the National Oceanographic Instrumentation Center of the Naval Oceanographic Office, and the United States Geological Survey's (USGS) Earth Resources Observation Program. In addition, Balch practically gained a commitment from the Coast Guard's data buoy project. The deal for the project to move to the MTF might have been consummated sooner, except for Hurricane Camille. In fact, the morning after Camille, Balch called the project's chief, Commander Peter Morrill, and told him in a depressed and distraught voice, "Don't come down to the Gulf Coast, it's gone!" Balch's troubling opinion of the state of the Mississippi Gulf Coast proved to be the description of a temporary condition.[33]

Although devastating at first, the long-term results of the hurricane had a positive influence on the MTF employees. The storm functioned as a catalyst for the renewal of a commitment to excellence. A source of encouragement serving to strengthen the MTF employee dedication came just before Christmas in 1969. ESSA Administrator Robert M. White awarded a plaque and citation to the MTF and the MSFC for "outstanding contributions to the success of BOMEX, the most extensive study ever conducted on energy exchanges between ocean and atmosphere." Balch received the plaque from Dr. White on behalf of his NASA-MTF organization and the MSFC. Von Braun, obviously pleased at the success of Jackson Balch and the MTF, stated that "this excellent demonstration of significant contributions in fields other than rocket testing certainly enhances the position of the MTF, as well as NASA." As a result, the decade of the 1960s ended on a positive note for Balch and his MTF team. The years were, indeed, a time of "triumph and tragedy," building the giant center in the swamps, testing for the Moon mission, destruction by Camille, and venturing into the scientific world in search for new missions.[34]

---

33. Captain Peter A. Morrill, interview by Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 442, 4 March 1993, p. 5, SSCHRC; Chronology, "Significant Actions Leading to Coast Guard Location at MTF," 1969, SSCHRC.

34. "BOMEX Citation Goes To Balch, *The Daily Herald*, 24 December 1969. The citation, or "award," given to Balch for the MTF achievements during Project BOMEX was the first such commendation for work done outside of NASA's organization.

A Storm Brews In Washington

A low-key observation by Philip E. Culbertson, NASA Headquarters director of Advanced Mission Programs, in early January 1970, indicated that another storm brewing in Washington could seriously affect the MTF's future. In the early days of NASA's struggle with a shrinking budget, Culbertson said, "Some very difficult decisions are going to have to be made, and NASA will be among those agencies which have to limit expenditures in a number of desirable areas." In answering a question asked about the fate of the MTF, Culbertson replied, "You have already seen one result of these decisions in the announcement of the shutdown of our Electronics Research Center in Boston. There will very possibly be other areas which are similarly affected. Whether or not the MTF will be among them I have no way of knowing, but we are going to have to be very careful in these considerations and arrive at a decision which will preserve the capability to move forward."[35]

NASA Administrator Paine announced on 14 January 1970 that huge cutbacks in the number of space workers nationwide and massive budget cuts would be included in Nixon's 27 January budget message to Congress. Paine said the shrinking workforce would be cut by an additional 50,000 people. And the former NASA budget of $5.176 billion in 1966 would not be more than $3.6 billion in fiscal year 1971. Even though his plans to conserve the space agency's funds included stretching out Saturn V flights, Paine said there were no plans to shut down the Michoud plant in New Orleans or the MTF, where the Saturn V stages were tested.[36]

The lean diet had already begun to take its toll at the MTF with its workforce down to just under 2,000 workers. North American Rockwell at the MTF, for instance, had reduced its force to 400 people working 40 hours to one shift, five days a week. During its peak Apollo testing at MTF, North American employed over 600 workers on three shifts, seven days a week. Senator Stennis remained optimistic, saying, "It is not hopeless for MTF; there will be more testing at the site, perhaps in connection with some new programs." Apparently, Stennis believed that the MTF would play a major

35. Harry F. Rosenthal, "Space Agency Plans To Draw Purse Strings," AP, *The Daily Herald*, 14 January 1970.
36. *Ibid.*

role in the Space Shuttle program being widely discussed in Washington and in the aerospace industry.[37]

At the time of Administrator Paine's statement in Washington, Balch was briefing Presidential advisors on the potential of the MTF for future scientific programs. Dr. James Wakelin, chairman of the President's Committee on Oceanography, and more than a dozen noted scientists spent the day with Balch and his staff. Balch took time to inform members of the media that he could not comment on Paine's statement about the "slowing down of the NASA program." He also said that testing the Saturn V stages would "involve MTF throughout 1970." It is interesting to note that Balch's search for new missions, as early as 1967, was not initiated any too soon.[38]

Culbertson's remarks in 1970 concerning the unknown fate of the MTF were overshadowed by Paine's appointment on 20 January of a special task force, with Jackson Balch as head, to study the MTF utilization. Balch immediately called his staff together, giving the lead role to Van King. King divided his report on the MTF's "two-year search" for new business into three categories: active, dormant, and possible. The federal and state agencies in King's findings included several that came to the MTF as residents in some type of organization. These agencies included NASA's Earth Resources Technology Satellite Program and the Earth Resources Aircraft Program; Federal Water Pollution Control Administration; USGS's Oil Pollution Control and Survey program and the Earth Resources Observation Systems program; National Oceanographic Instrumentation Center; Naval Weather Command; U.S. Coast Guard's National Data Buoy program; and Bureau of Commercial Fisheries. In his report to Balch, King pointed out there was confusion due to the Headquarters, MSFC, and MTF personnel contacting the same agency. This was harming the search for new business and slowed commitments from potential tenants. At this time, the MTF was still working under the MSFC Industrial Operations; therefore, representatives from that organization, and its director's office, and Headquarters could all become involved in negotiating with a prospective agency. Through this lack of coordination, King felt that interested parties were confused and uninformed.[39]

---

37. "Balch Sees Rocket Testings Throughout 1970," *The Daily Herald*, 15 January 1970.
38. Paine to Balch, 20 January 1970, SSCHRC.
39. King to Balch, 20 May 1970, SSCHRC.

Although Administrator Paine and his staff were working diligently with Balch and the MTF team, NASA seemed to be plagued with inopportune and uncoordinated public announcements. NASA Deputy Administrator Dr. George Low, during a trip to Huntsville on 3 February 1970, made a long-remembered announcement that the MTF would be reduced to "a caretaker status," employing no more than 150–200 persons. The announcement was made at the MSFC and was piped on an audio line to the MTF, where employees and members of the local press heard the bad news. Dr. Low also pointed out that "only 500 workers" would be reduced at the MSFC. At the time, the MTF had nearly 2,000 employees, and Low's continued employment prediction of 150–200 meant that 1,800 MTF employees would be without jobs. This was seen as a catalyst for economic disaster in an already ailing community that had not really begun to recover from Camille. *The Tupelo (Mississippi) Daily Journal* explained that the "economy of Hancock County, Bay St. Louis, Waveland, Slidell, Picayune, and, to a lesser degree, other communities in the coast area are closely tied to [the] MTF and the 2,000 employees of that facility."[40]

The Low announcement provided a "deja vu" experience for all concerned with the facility. Congressmen from Mississippi and Louisiana began immediately to protest the "planned mothballing of MTF." Senators Eastland and Stennis of Mississippi and Long and Ellender of Louisiana, plus Representatives Gillespie "Sonny" Montgomery and William "Bill" Colmer of Mississippi and Hale Boggs of Louisiana all pledged to work for future business for the MTF. The White House issued a statement that the federal government would make "every effort to locate other sources of employment during this phaseout period and have them ready to move in when the mothballing time arrives." The political forces backing the MTF picked up additional support from Senator Birch Bayh of Indiana, chairman of the Senate Public Works Disaster Relief Committee. Bayh was on the Gulf Coast conducting hearings when Dr. Low's announcement was made. Bayh said "Every consideration will be made to help relieve problems which may be caused locally by such [national] NASA cutbacks."[41]

The Low announcement resulted in a focused effort of congressional and executive support for new and expanded missions for the MTF. The reality of

---

40. "Manned Program Suspension Rocket Tests," *The Tupelo (MS) Daily Journal*, 3 February 1970.
41. "Congressmen Protest NASA-MTF Mothballing," *The Sea Coast Echo*, 10 February 1970.

a shrinking NASA budget, the plight of the storm-ravaged Gulf Coast, and the dwindling workforce at the MTF produced an urgency not felt earlier. Congressman Colmer told local citizens that "Senators Stennis, Eastland, and I are continuing our best efforts to lessen the tragic impact that would result from any attrition in employment." Colmer pointed out that they were "working on specific installations such as the Coast Guard, Oceanography Center, Department of Transportation experiments, and Gulf Universities Research project." Stennis took an even stronger and more optimistic stance when he stated, "I am exerting all possible efforts to see that this facility will continue to operate with some active federal program."[42]

NASA officials knew that the powerful Senator from Mississippi was extremely supportive of the MTF and was always vocal on affairs that affected the site. In addition, the Headquarters's managers knew the forward-thinking solon was one of NASA's most potent and consistent backers. With the support of such a strong ally, it is difficult to see why "dire announcements" concerning the MTF kept coming from the MSFC and Headquarters. In all fairness to NASA Headquarters's officials, the Agency was faced with its most difficult budget crisis. Occurring in January 1970 during the Nixon administration, the crisis followed the first lunar landing in the midst of changing national priorities.[43]

The total budget outlay proposed for NASA in fiscal year 1971 was $3.4 billion, which was $436 million less than in fiscal year 1970—a 12 percent decrease. Actually, the budget wound up at a lower figure—$3.381 billion. Thousands of contractor and civil service personnel were cut back nationwide. The Agency was trying to stay afloat in the waning days of the Apollo program and, at the same time, start anew with the Space Shuttle program. During the buildup of the Apollo program, NASA built a massive infrastructure to support its programs. With the Vietnam War continuing to escalate and increasing national inflation, money for space exploration was decreasing dramatically. In response to expected reductions in funding, Paine and his budget managers had to make severe and unpopular decisions. In many cases, popular programs and installations fully funded a few years earlier were cut

42. "Strong Pressure Being Exerted To Avoid Mothballing," *The Picayune (MS) Item* (henceforth referred to as *Picayune Item*), 26 February 1970.

43. *Ibid.*

from the budget. To compound the dilemma, Paine and his managers were caught between the President needing funds for the Vietnam War and the funds needed for the new environmental programs. A number of strong members of Congress, such as Stennis, wanted to keep their new-found pro-space constituency intact. With these factors in mind, astute managers such as Paine often tried to manipulate the system to provide enough funds to keep the Agency viable.[44]

Since Balch had already begun his move to transform the MTF into a multiagency center for environmental and oceanographic studies, his strongest competition from sibling NASA elements existed in the Test Complex at the MTF, where the big rocket propulsion hardware was tested. Although Balch was both preoccupied and fascinated by the science agencies, he knew the MTF needed to remain a NASA facility—with rocket testing as its main focus—in order to sustain the huge $350 million installation. Thus, Balch's thrust for new missions continued outside NASA, while, at the same time, he kept an eye on the Space Shuttle program developments. Balch did so because he recognized the shuttle program as a sustaining project, until the environmental-oceanographic centers at the MTF developed to the point the facility could be self-sustaining. Administrator Paine knew Balch's strategy from discussions with Balch and from his own contacts at GE. The Administrator worked hard to help Balch in his search for new programs, as the other NASA centers were not similarly self-driven and they wanted continued funding from the dwindling NASA budget. A healthy respect was earned for the MTF for their efforts during the "hard times" of the early 1970s.[45]

A War Of Words

As the MTF Balch-driven scheme heated up, a flurry of executive correspondence was exchanged between Balch, Stennis, Ellender, Paine, and the White House. Because of NASA correspondence staffing procedures, the letters

---

44. "New U.S. Budget Reduces MTF To Caretaker Status," *The Clarion-Ledger*, 27 February 1970; Gray and Hicks, "The Mississippi Test Facility: A Study In Organizational Viability, pp. 38–52; *NASA Pocket Statistics* (Washington, DC: NASA SP 033-000-01150-4, 1995); Launius, *NASA: A History Of The U.S. Civil Space Program*, p. 104.
45. Gray and Hicks, ". . . A Study In Organizational Viability," pp. 49–51.

and studies flying back and forth consumed a great deal of work and served as notice to everyone close to the MTF situation that a powerful political delegation was at work. The paper battle initiated by the MTF also alerted officials in the scientific agencies outside NASA that Balch and his little band of engineer-scientists had the support of a congressional caucus that could certainly affect the future of governmental departments and agencies under its purview. The much ado about the MTF amused some and angered others, but, in all cases, the attention prompted all concerned to sit up and take notice of the growing strength of the fighting "Balchites" in Mississippi.[46]

The first half of 1970 represented a major offensive in Balch's battle for new MTF missions, and in the evolving concept of an "environmental center" for southwest Mississippi. A break in the unrelenting campaign waged by Balch and his MTF team came on 11 February 1970, when Dr. Lee DuBridge, Nixon's science advisor, endorsed the prospect of using the MTF as a "dedicated facility for the Earth resources and environmental programs." In a letter to Paine, DuBridge said a dedicated center for these programs appeared to be essential to the solution of the many problems encountered in acquisition and reduction of data gathered by NASA and the federal and state agencies involved in environmental research. DuBridge mentioned several advantages to having a center capable of supporting "coastal and marine environmental programs which would include massive amounts of data from surface, airborne, and spaceborne collection systems." His letter to Paine echoed Balch's concept for the "new MTF" that he had been trying to communicate for about three years.[47]

In an effort to bring the MTF situation to a head, Stennis wrote a powerful letter to President Nixon on 16 March 1970 "urgently requesting" that (1) an environmental center be set up at the MTF, (2) a National Earth Resources and Environmental Data Program be established at the Mississippi site, and (3) an examination be conducted of all applicable agencies budgeted, with a high-ranking body composed of the heads of all entities

---

46. Balch to J.T. Shepherd, 19 May 1970, SSCHRC.

47. Jackson Balch, "Significant Actions Changing Utilization," *Director's Office Files: Correspondence Log*, 20 January–9 July 1970, SSCHRC; DuBridge to Paine. From the content of his correspondence, Dubridge obviously felt the MTF was an excellent choice to locate an environmental center in a move to protect the environment and make better use of existing resources. Although Nixon needed Stennis's support in the Senate, the DuBridge letters and his expressed feelings about the MTF appeared to be above expedient politics.

involved meeting to ensure managerial, programmatic, and resource adjustments necessary to the Data Program.[48]

Paine also urged Nixon to support a similar program at the MTF, but not on a national scale as DuBridge, Balch, and Stennis had strongly suggested. The NASA Administrator made his Presidential recommendation based on a paper prepared for him by the Balch group entitled, "A Proposal For The Future Utilization Of The MTF," dated 10 March 1970. Paine's recommendation to the President was made as a formal proposal and asked that a regional "Gulf Coast Environmental Center" be established at the MTF, along with a "Mississippi Gulf Coast Recovery Program" also at the MTF to assist the Governor's Emergency Council. Paine possibly felt a "regional" center would be easier to develop, or perhaps less costly to set up. The regional environmental center suggested by Paine consisted of several agencies Balch had been working with, such as the Bureau of Commercial Fisheries's water pollution program for the Gulf region. Included also were the Coast Guard data buoy program, an environmental program proposed by the Gulf Universities Research Corporation; a meteorological and air pollution studies center for ESSA; and NASA's Earth resources facility, with the Gulf Coast region as the main focus.[49]

Paine's proposal to the President was obviously an earnest attempt to settle the MTF situation for NASA, Senators Stennis and Ellender, and the MTF Manager Balch. Paine's plan fell short, however, because it limited the proposed MTF program to a regional operation, when the President's advisors and Balch were aiming for a national enterprise. Balch later said that the programs at the MTF were "national in scope" and insisted they be named and referred to as such.[50]

As the battle over the future of the MTF continued, the Mississippi test team carried on with its Saturn V flight-certification tests, getting nearer with each static firing to the end of its mission. The test engineers and people across the nation and around the world stopped everything they were doing and held their breath when an explosion in space curtailed the flight of Apollo 13. With a Gulf Coast native, Fred Haise of Biloxi, as lunar module pilot, the lift-off

---

48. Stennis to Nixon, 16 March 1970, SSCHRC.
49. Paine to Nixon, 17 March 1970, SSCHRC.
50. Paine to Nixon, 10 March 1970, SSCHRC. Paine's letter to the President expressed a willingness for NASA to move to achieve Stennis's and Ellender's goals to locate an environmental center at the MTF.

from the KSC was on 11 April 1970. During a nominal launch and insertion phase with the MTF-tested rocket stages performing perfectly, James Lovell, commander; John L. Sweigert, Jr., command module pilot; and Haise became international heroes as they and their Mission Control colleagues guided the craft around the Moon and safely back to Earth. The MTF's Henry Auter, Terry Malone, and A.J. "Jack" Rogers, Jr., stayed at the Haise residence in Biloxi during the mission, keeping the family informed and making every effort to allay their fears as the crippled ship made its way back to Earth.[51]

On the same day Apollo 13 lifted off, Bryce Harlow, Nixon's aide and counsel, wrote to Stennis and assured him that the "MTF offices, its laboratories, and the Slidell Computer Complex would remain open." Harlow's letter of assurance was not enough to satisfy Stennis, who was becoming increasingly impatient and tired of the promises made to him by the White House and NASA. In the midst of the promises and aggravation, *The Los Angeles Times* news service ran a nationwide lengthy analysis entitled, "How NASA Lowered The Boom: The Rape Of Bay St. Louis." The article chronicled the sad story of Bay St. Louis's investment in the Space Age and how the MTF would be cut from 2,000 employees to 200, spelling ruin to the local communities already devastated by Hurricane Camille. Stennis made promises at Logtown in 1961 to "protect and defend" the people who gave up their land for the NASA-MTF project. And, as a conservative and frugal man, Stennis could not tolerate being party to the government waste of a $350 million facility by "walking off and leaving the investment." In a real sense, the negotiations Stennis had with NASA about the MTF were personal, not political in nature as some imagined. Stennis had made a personal commitment that he intended to keep at all costs.[52]

Keeping the pressure on NASA and the White House, Stennis, chairman of the Armed Services Committee, and Ellender, chairman of the Appropriations Committee, sent strong messages to the NASA Administrator. Stennis told Paine on 19 May 1970 that he "continued to be concerned" and requested that Paine furnish him Agency names, status of actions, and the NASA personnel responsible for establishing the new programs in Mississippi. Paine again

---

51. NASA-PAO Press Release, "20th Anniversary Press Kit," Release No. 78–133, 1978, SSCHRC. The Insertion Phase is the portion of the flight immediately following the launch and systems checkout in Earth's orbit. During this phase of the flight, the spacecraft is propelled from Earth's orbit into a trajectory that will take the craft to the vicinity of the Moon.

52. Harlow to Stennis, 11 April 1970, SSCHRC; Baxter, interview; See Chapter 3, "The Thorn Before The Rose."

promised Stennis, on 1 June, that "NASA will keep [the] MTF offices open for other activities that the Agency [hoped] to attract." Senator Ellender, who had been vocal in the news media while proposing an "environmental center for [the] MTF" and future uses for the Slidell complex, wrote to Paine demanding answers about continued use of the MTF and Slidell facilities. Ellender questioned the "relevance of NASA" in the changing priorities of the nation and whether "the government [would] let this magnificent scientific complex become the world's biggest white elephant or do we give it another, and, perhaps, an even more important job to do." Furthermore, Senators Stennis, Ellender, Long, and Eastland notified the President of their regrets that no significant action as to the future of the MTF was realized as a result of all their efforts. Nixon immediately informed Stennis that (1) an Earth Resources Laboratory (ERL) would be established at the MTF and (2) that agreements had been reached with the National Data Buoy Project and the Bureau of Commercial Fisheries to relocate to the MTF.[53]

The Data Buoy and the Fisheries programs named by the White House to be relocated to the MTF had begun taking shape back in 1968, at the very beginning of Balch's and King's searches for new missions. The MTF learned from BOMEX of the need for satellite and airborne observations for ocean and environmental research. Through BOMEX, the MTF also learned of the early work under way by ESSA and the Coast Guard on instrumented data buoys, used to help measure ocean dynamics. The MTF search for new projects led to the discovery of offices involved in Earth resources research under way at the MSFC and Goddard Space Flight Center, and by the USGS. The MTF also learned the USGS wanted to establish a center to use space and airborne information. Balch firmly believed that using satellites for "looking down at the Earth" and as communications links for data were the most important finds in the new space program. He and King felt that satellites constituted the very heart of their new center, which would specialize in gathering and reducing space-derived data. The "synergistic relationship" of the agencies, in Balch's words, "would make their collective information more usable to the decision makers of the country."[54]

---

53. Stennis to Paine, 19 May 1970, SSCHRC; Paine to Stennis, 22 May 1970, SSCHRC; Paine to Stennis, 1 June 1970, SSCHRC; Stennis, Ellender, Long, and Eastland to Nixon, 12 June 1970, SSCHRC; Eberhard Rees to Jackson Balch, 14 June 1970, SSCHRC.
54. Balch to Governor John Bell Williams, 28 June 1971, SSCHRC.

In order to ensure the national commitment to the MTF, Ellender's Appropriations Committee earmarked $10 million to create an environmental center. What shocked NASA so much was that the $10 million came from the Agency's $678 million research-program management fund, which the committee approved for NASA. The bill specified that the $10 million be used only at the MTF and the Slidell Complex to accommodate Earth environmental studies, furnishing basic institutional and technical services to other agencies in pursuit of space and environmental missions. Ellender summed up the significance of the bill by explaining that "until now, financial means have been lacking to make a truly attractive offer to many of the other federal agencies which are being encouraged to locate major activities at the MTF-Slidell." Ellender also explained that "the $10 million in the NASA appropriations earmarked for [the] MTF and Slidell [Complex] will allow NASA to offer technological services on a cost-free basis to other research agencies which otherwise would have to pay for these services." The funds, which came to be known as the "$10 million set-aside" funds, elevated the MTF from a relatively obscure sibling at the NASA family table to a rowdy "child" taking food from everyone's plate. Balch's political shenanigans now became known throughout NASA, especially by those who juggled daily operating funds during the lean, post-Apollo years.[55]

New Agencies Arrive

With a firm promise of funds for the multiagency environmental center, Balch and his victorious band welcomed the announcement of the first tenant, or "resident agency" as Balch preferred to call the gathering environmental and oceanographic researchers. After at least 35 official contacts, meetings, and executive letters of remark, the Coast Guard's National Data Buoy Project announced its relocation to the MTF on 9 July 1970. King and Alex Peresich of the MTF group first made contact with the Coast Guard to discuss the fledgling data buoy program on 1 October 1968 when they were "fishing around" during the formative days of BOMEX. On Stennis's return to the MTF, King and Balch informed him about the program, and the Senator immediately took

55. "Funds For New Center Slated," *The Times-Picayune*, 26 June 1970.

a keen interest in developing the idea of a data buoy project located on the Mississippi Coast. Stennis told Balch to "explore the possibility of the MTF as a 'home base' for the data buoy project." The negotiations went on for another year, slowed only by the MTF-MSFC-Headquarters organization tangle and a reluctance by NASA to furnish even a small support arrangement. The Ellender-Stennis "set-aside" funds amendment apparently bridged the financial gap and paved the way for the final agreement. At any rate, many lessons were learned during the Coast Guard-NASA negotiations that were applied to other federal and state agencies that came aboard the MTF ship.[56]

No doubt, Administrator Paine was "relieved" when he and Admiral T.R. Sargent, acting commandant of the United States Coast Guard (USCG), signed an agreement in Washington, whereby the USCG would conduct its National Data Buoy Project at the MTF. The agreement established basic operation support and a reimbursement relationship between the two agencies. The Coast Guard agreed to fund its program and reimburse NASA for additional, identifiable costs.[57]

The establishment of the data buoy project provided a precedent and credibility for the MTF to use in its negotiations. In addition, the National Data Buoy/NASA agreement provided the "blueprint" for other agencies to come and share in knowledge, as well as costs, as they pursued their own independent projects. Most importantly, however, prospective agencies knew they would have a certain amount of protection from severe budget cuts with Senators Stennis, Ellender, Long, Eastland, and Representatives Colmer, Hebert, Boggs, and even the White House watching over their pocketbooks.[58]

With a sense that their National Data Buoy Project was "special" to the new MTF environmental concept, the Coast Guard stationed an extremely capable manager, Commander Peter Morrill, to head the operation. Later promoted to Captain, Morrill opened shop at the MTF with 23 people and "a very large budget." Balch gave Morrill the office suite just above his own on the third floor of Building 1100. In front of the building, Balch and Morrill raised the first of several "resident agency" flags when they hoisted the Coast Guard colors. The

---

56. U.S. Coast Guard, "U.S. Coast Guard Sequence Of Events Leading To Location Of National Data Buoy Development Program, and Summary," 1970, SSCHRC; Morrill, interview.

57. NASA Headquarters News Release, Release No. 70-114, "Coast Guard To Use Mississippi Test Facility," 9 July 1970, NASA Historical Reference Collection (henceforth referred to as NHRC).

58. Gray and Hicks, "The Mississippi Test Facility: A Study In Organizational Viability," pp. 50-51.



The first federal government agency to join NASA at the Mississippi Test Facility (MTF) was the U.S. Coast Guard's Data Buoy Project in 1970. Capt. Peter Morrill, first Coast Guard onsite manager, at podium, is joined by Henry Auter, Jackson Balch, and visiting Coast Guard officers for an official welcome in front of Building 1100. The Data Buoy Project later became the NOAA National Data Buoy Center and in 1997 was under the direction of Dr. Jerry C. McCall. (SSC-70-449-3)

flamboyant Jackson Balch and colorful Peter Morrill became close friends. It was following many hours spent relaxing on the porch of Balch's new residence, built after Hurricane Camille, that Morrill observed and later commented, "The man had more feeling. . . he was totally dedicated to this area."[59]

Stennis was more than pleased with the Coast Guard's location at the MTF. Bringing the historic and prestigious Coast Guard in as the MTF's first new agency was a special coup for Stennis. Immediately after the agreement was signed, Stennis issued a statement that said the USCG project budget would reach $100 million as headquarters for a program to develop automated data buoys. Furthermore, he predicted the project would eventually employ 90 people. With the knowledge of other agencies contemplating relocation to the MTF site, the proud Senator stated that the Coast Guard was the "first of several projects expected to be established at [the] MTF."[60]

59. Morrill, interview.

60. "Data Buoy System Assigned To MTF," *The Daily Herald*, 9 July 1970; "$100 Million MTF Deal," *Picayune Item*, 16 July 1970.

Right on the heels of the USCG project's location at the MTF, NASA responded to the Ellender and Stennis strong request to locate an "Earth resources program" at the Mississippi site. On 9 September 1970, NASA announced the establishment of an Earth Resources Laboratory (ERL). A distinguished NASA researcher, Robert O. Piland, deputy director of Science and Applications at the Manned Spacecraft Center in Houston, was named to head the new MTF Laboratory. Organized at Johnson Space Center (JSC), the ERL was set up for research in the applications of remote sensing techniques. The Laboratory used data generated by ERL aircraft flying out of Houston, and later from Stennis International Airport in Hancock County, and by the Technology Satellite and the manned orbiting Skylab spacecraft—both were set for launch in 1972. The data gathered by aircraft and spacecraft were to be correlated with data gathered on the surface and then analyzed for potential benefits to interests such as the seafood industry, forestry concerns, and agriculture. The scientific unit would employ 75 people who were experts in physics, geoscience, instrumentation, and data handling. These specialists were the kind of people Balch wanted for his new "crossroads of science." The growth potential was expected to reach as many as 185 people "within two years." This possible growth was especially good news to Stennis and Balch, because the MTF population in September 1970 had dropped to about 1,600 and was on a fast, steep, downward plunge. And the bottom was expected to fall out when all rocket testing was completed later in the fall.[61]

Piland had done an outstanding job putting the remote sensing program together in Texas, and he enticed a number of experienced scientists to make the adventurous move to Mississippi. Piland also asked Balch for a strong person to be his deputy for the new laboratory. The two managers agreed on Darden W. "Wayne" Mooneyhan, one of Balch's best engineers. Thrilled by the prospect of obtaining a major element of his "environmental center," Balch provided Piland with another engineer, Alex Peresich, to help the Houston team get the Laboratory started. NASA Headquarters stopped short, however, of giving Balch control of this organization. Organizationally, the ERL, located under Balch's nose at the MTF, remained under NASA-JSC

61. NASA Headquarters News Release, "Earth Resources Facility," no. 70–147, 9 September 1970, NHRC; "NASA Facility To House Earth Project," *The Hattiesburg (MS) American*, 9 September 1970; "Earth Resource Program Starts At MTF Today," MSFC *Marshall Star*, 9 September 1970.

management, with a management hierarchy stretching over 400 miles back to Dr. Robert Gilruth in Houston. Members of the MTF team felt that denying Balch control of the Laboratory was a "spiteful slap in Balch's face." Many years later, long after Balch retired, the folly of that long-distance management tangle was corrected.[62]

Outwardly, however, Balch and his MTF supporters seized the moment and accepted the ERL establishment at the MTF as a NASA centerpiece in the establishment of a family of environmental research agencies and a key move toward "full utilization." In addition, the ERL was an important building block in constructing the "environmental center" on the Gulf Coast.[63]

On the surface, NASA's search for new missions was gaining momentum, and the local communities felt somewhat relieved with the USCG and ERL announcements. But behind closed doors at the MTF, Henry Auter and a few selected engineers were quietly preparing a response to the NASA-MSFC "Downmoding Plan" to mothball the Saturn V Test Complex, including all S-II and S-IC facilities and their supporting infrastructure. The plan was being carried out by a joint committee—the MTF Downmoding Planning Group headed by Jim Shepherd of MSFC and Auter at the MTF. The intent of the plan was to ready the site for a standby mode no later than 1 April 1971. When talk of downmoding first hit the press back in January 1970, some hope existed that uses would be found in the future for Saturn vehicles. But, as the months wore on and production at Michoud was curtailed, the MTF personnel recognized that their test mission would end with the static firing of the final stages for the first 15 vehicles. The downmoding plan had provisions to "retest" the remaining stages that would be stored in inventory, "with 12-months' notice" if they needed to support additional programs. The plan called for only 235 people to perform simple maintenance, building upkeep, and security patrol. With such a drastic cutback in the rocket business, the pressure remained on the Balch-MTF organization to move with haste toward attracting new agencies and finding new missions for the people left onsite.[64]

---

62. Roy Estess, interview by Mack Herring and Ms. Myron Webb, SSC, 7 July 1995, SSCHRC.

63. *Ibid.*

64. Henry Auter for Jackson M. Balch, Memorandum For Record, "Prepare Downmoding Plan," 13 August 1970, SSCHRC; NASA-MTF Test & Quality Evaluation Office, "Standby Plan," 8 September 1970, SSCHRC; Roy Estess, interview by Henry Dethloff, 18 June 1991, p. 11. Estess gave rich descriptions of the downmode process in this interview.

While the grim work on the downmoding plan continued in secrecy, the Mississippi congressional delegation announced that another environmental research agency, the Bureau of Commercial Fisheries, intended to locate at the MTF to "conduct long-range studies through the use of NASA's great outlay of technical equipment." Stennis and Colmer were advised 26 August 1970 that the fisheries bureau would conduct "aerospace sensing studies involving sightings with amplifiers, laser, and aerial photographs to help detect schools of fish from high altitudes." Ultimately, the first three agencies, the Coast Guard, ERL, and Bureau of Marine Fisheries, provided for an interrelated working environment involving space, Earth, and ocean studies at the MTF.[65]

The "new MTF" was materializing, even as the deep, thundering rumblings of the giant Saturn V rockets were about to be silenced. The final S-IC booster test took place at 6:17 p.m. on 30 September 1970. The successful test lasted a few seconds over two minutes. The S-IC-15 was the last of the booster stages manufactured by Boeing at Michoud. Only one test remained for the MTF, scheduled one month later on the same A-2 test stand where static firings first began on 23 April 1966. As far as anyone knew at the time, the S-II-15 static firing would be the last rocket tested at the short-lived, national rocket-testing site.[66]

One month after the final S-IC booster-stage static firing shook the Mississippi coastal plain for the last time, the final, Saturn V, second-stage S-II-15 was tested for its full duration of six minutes, thirteen seconds, on 30 October 1970. The North American Rockwell test team ignited the powerful hydrogen rocket at 3:15 p.m., following a countdown that went "without a hitch." In fact, the test was actually 30 minutes ahead of schedule. With the test completed, and the last echo of the sucking sound produced at engine cutoff faded, a stillness returned to the forest around the complex that had not been felt since the first chain saws broke the silence of the swamp on 17 May 1963. Hundreds of employees, NASA officials, and community visitors attended the

---

65. NASA-MTF News Release, 26 August 1970, SSCHRC; "Fish Studies Set At NASA Test Site," *The (New Orleans, LA) States-Item*, 27 August 1970. See description of Bureau of Commercial Fisheries activity proposed for the MTF in memorandum from E.W. "Van" King to Jackson Balch dated 19 May 1970. This activity became part of NOAA and was renamed "National Marine Fisheries." They worked closely with NASA's Earth Resources Laboratory, DOI's Earth Resources Observation Systems office, and Gulf Coast commercial fishermen.

66. MSFC Test Program Summary For Saturn V/Apollo S-IC Stage, October 1970, SSCHRC; See Bilstein's *Stages To Saturn* for in-depth discussion of Saturn V test program.

historic static firing. Jackson Balch told reporters that the S-II firing and the S-IC test on 30 September were the best prepared and executed during the entire Saturn V program. Both test teams started their countdowns with the conviction of going out "in a blaze of glory." And so they did. All told, the MTF government-industry team tested 27 Saturn V rocket stages, and all that were launched performed their missions in space without a single failure.[67]

Black Monday

With the last sounds of the big Saturn boosters silenced, the rocket-testing business at the MTF was in for some unexpected "loud noise" by NASA's top brass who came to the test site for a "final" awards ceremony. Since the 9 November 1970 ceremony heralded the end of testing at the MTF, as well as a "pat on the back" to the employees, the day was called "Black Monday" by *The Huntsville Times*. Few of the employees who lost their jobs at the MTF disagreed with the ominous tag. Acting NASA Administrator George M. Low was accompanied to the MTF by a host of NASA's top managers from the Headquarters and the MSFC. Balch and his staff members did not view the ceremony as a "special honor." Instead, they felt their NASA-MSFC bosses were coming down to say "Thanks for a good job; now get busy and shut this place down." And Balch conveyed the message to the entire Mississippi congressional delegation. The Balch invitation list did not stop with Stennis and Colmer. He added Governor Williams, community leaders from the entire area, and top officials from at least 10 federal agencies that were either onsite or considering locating at the MTF.[68]

On the other hand, Low brought practically the entire NASA hierarchy to pay tribute to the MTF rocket test team. With the Administrator were Dale D. Myers, associate administrator for Manned Space Flight; Eberhard Rees, director, MSFC; and Lee B. James, director, MSFC Program Management. In

67. Space Division, Mississippi Test Operations, "S-II Stages Static Firing Summary," November 1970, SSCHRC; Richard Glazier and Ted O'Boyle, "Last Rocket Tested: MTF's Mission Ended," *The Daily Herald*, 31 October 1970; Bilstein's *Stages To Saturn*, pp. 232–233, 74.

68. "Final Awards Ceremony 'Black Monday' For MTF Employees," *The Huntsville (AL) Times*, 9 November 1970; NASA-MTF News Release, 6 November 1970, SSCHRC; NASA-MTF News Release, 9 November 1970, SSCHRC; Balch to Dr. Charles C. Bates, 23 October 1970.

addition, Low also brought Fred Haise, Apollo 13 astronaut and Gulf Coast native, and Wernher von Braun, no longer the MSFC director, but still considered the world's foremost rocket scientist and "father of the MTF."[69]

The closing ceremony for the MTF was originally scheduled as an outdoor affair so more employees and their guests could participate, but rain drove the crowd indoors into the Central Control Building auditorium. The auditorium only accommodated 275 people, so hundreds more jammed the lobby and listened at other onsite locations through a sitewide communications hookup. Special plaques were given to representatives of NASA's MTF prime contractors for their contributions to the successful completion of the Saturn static firing program. Many smaller MTF government and contractor agencies also received plaques. In addition, a special "honor roll" was engraved in gold and it hung for many years in the Building 1100 lobby and then, later, in the MTF Visitors Center.[70]



Jackson Balch (left) hurries Sen. Stennis (center) and NASA Acting Administrator George Low during a busy and well-remembered day at the Mississippi Test Facility (MTF) in November 1970. A host of NASA Headquarters officials, agency heads, and members of Congress came to MTF for an "Apollo Awards Ceremony" that turned into an all-day business session with the future of the installation being the main topic of conversation. (SSC-70-571-2)

69. NASA-MTF News Release, 9 November 1970, SSCHRC.
70. *Ibid.*; "Final Awards Ceremony. . . ," *The Huntsville Times*.

The ceremony was important, but not nearly as important as the heavy politicking that went on behind closed doors with Stennis, Colmer, Williams, and Balch clashing with Low and the Washington dignitaries. Many MTF employees point to Black Monday as the "turning point" for the facility. The fireworks at the November awards ceremony made a lasting impression on Low, Myers, Rees, and their staffs, who received the brunt of the political onslaught. Stennis, Colmer, and Williams ushered the NASA dignitaries into the big conference room in Building 1100. There, Stennis outlined the importance of NASA supporting activities at the MTF. Colmer, according to Henry Auter, told Low that "Senator Stennis is noted to be a gentleman, and you may not understand his message, but I am telling you now that if NASA fails to support [the] MTF, we will withdraw our support from NASA." Colmer's blunt words were especially threatening to Low and the NASA officials who were already facing serious budget reductions in the near future. All those in attendance knew that the support of Stennis, Colmer, and their friends in the Congress was absolutely necessary, not only for the Agency to survive, but also to fund future programs such as the Space Shuttle.[71]

With rocket testing now officially over, the MTF turned its attention to its new environmental and oceanographic missions. On 19 November 1970, the Coast Guard brought its first vessel, the cutter *Pointe Estero*, to the MTF to begin work that the crew would be performing in conjunction with the data buoy project. The cutter was brought up the Pearl River and tied up at the dock where the buoy project was located. The *Estero*, originally stationed at Gulfport, was the support vessel for the worldwide, automated data buoy project. The *Estero*'s maiden and subsequent voyages highlighted the fact that the MTF's harbor had access to the oceans of the world. A crowd of new Coast Guard employees, along with fellow MTF personnel attached to NASA, gathered at the dock to welcome the Coast Guard vessel.[72]

The coming of the Coast Guard with the cutter *Estero* to the Mississippi facility, however, was not the only new agency joining the "MTF community." Balch formed a Planning Task Force to handle liaison activities with agencies already in residence and ones that were anticipated to locate at the new environmental center. Balch intended to organize the site to advance the

---

71. *Ibid.*
72. NASA-MTF News Release, 19 November 1970, SSCHRC.

integration of the newly arriving agencies. He named Waldo Dearing as head of the Planning Task Force and prepared the necessary contracts to support the effort. A.J. "Jack" Rogers, Jr., was appointed as Dearing's assistant. The task force was responsible for new business activities and preparation of a procurement plan for a proposed technical services contract to interface with the new agencies. Balch made other appointments that included liaison positions, such as John Ivey to work with the Environmental Protection Agency (EPA), Federal Water Quality Administration, and the Department of the Army (DOA) Munitions Command; Kenneth R. Daughtrey to work with the Department of the Interior (DOI); William G. Spradlin to assist the instrumentation and laboratory analysis services; and Lelyn "Lee" Nybo, assisted by James Taylor, to coordinate the data support services.[73]

Further appointments by Balch ushered in the beginnings of a "new" marketing function for the MTF-NASA that continued for years. A coordination role was now emphasized, as well as a marketing function, when Balch named Roy Estess, John Ivey, and Ken Daughtrey to "pursue opportunities" in their liaison positions with their respective agencies. They were to (1) keep the new ERL organization informed; (2) study all background material available and become "imaginatively" conversant with new agencies and opportunities; and (3) focus on the interagency concept, promoting synergistic interfaces with potential new agencies. The plan also called for Estess, Ivey, and Daughtrey to keep Balch informed through "constant" contacts and meetings. All three coordinators were to work closely with Dearing and Rogers of the MTF Planning Task Force, in addition to their coordination efforts with the MSFC and the Headquarters. Balch also directed the new "marketeers" to become involved in the "scoping out of requirements for the technical services contract." It is important to note, however, that few organizations in government or industry would have asked its marketing division to also be responsible for developing new programs and contracts requirements.[74]

New onsite business provided jobs for some NASA and contractor employees, but even the best of plans could not provide MTF employment for the 652 Boeing, North American, and Rocketdyne engineers and technicians. More than 200 GE personnel were also unemployed after the last Saturn V

73. Memorandum for the Record, "Balch to distribution list, 30 November 1970," SSCHRC
74. *Ibid.*

test. Development and testing of a reusable Space Shuttle, which could be launched like a rocket, perform useful tasks in Earth orbit, and land like an airplane, were being discussed during this time. First envisioned by von Braun and then presented in a *Collier's* magazine article in March 1952, the shuttle was part of a broad scheme that included a space station. As planning continued during the late 1960s, budgets became tighter, and the space station was dropped from future planning. As a result, more emphasis was placed on developing a Space Shuttle with a reusable engine. The engine development and continued fitness-testing programs were considered an asset to any site, because of the long-range testing that would go on as long as the shuttle flew. NASA's Julian Sheer, assistant administrator for Public Affairs, said that before the site selections were made, "The program could go up to $20 billion—and we'd never build any more." *The Wall Street Journal* commented on the site selections for the shuttle in an article entitled, "Roll out the Pork Barrel," and pointed out that NASA could launch from one site, test at another, and land at yet another location. *The Wall Street Journal* also noted that the MTF was well-suited for testing the engines, but could also be used as a launch site.[75]

Knowing that he needed a "bread and butter" program in the test complex, Balch asked Mooneyhan to prepare a proposal for the Space Shuttle engine testing to be done at the MTF. When Piland asked for Mooneyhan's services, Balch assigned Roy Estess, an engineer, to work on preparing the pitch scheduled at NASA Headquarters on 12 December 1970, before a committee headed by Floyd Thompson, director of Langley Research Center. Balch later quietly admitted that he was not personally committed to the Space Shuttle program, but he knew that the MTF, still on life-support systems, needed the propulsion test project to survive.[76]

---

75. MTF Personnel Reports, 1970; Jonathan Spivak, "Roll Out The Pork Barrel: Space Agency May Shun Cape Kennedy Site, Launch $6 Billion Space Shuttle Elsewhere," *The Wall Street Journal*, 3 December 1970; Wernher von Braun, "Crossing the Last Frontier," *Colliers*, 22 March 1952, p. 24; NASA Headquarters PAO, "Space Shuttle Decision," 15 March 1972, SSCHRC; Roger D. Launius, "NASA And The Decision To Build The Space Shuttle, 1969–72," *The Historian*, vol. 57 (Autumn 1994), pp. 103.

76. Estess, interview; Estess, interview by Dethloff.

CHAPTER 9

Toward Full Utilization

The New MTF

The Mississippi Test Facility (MTF) continued its free fall from the Moon despite progress toward becoming a multiagency space and environmental center. But, before the MTF hit mud-bottom and was reduced to caretaker status, Stennis, Balch, and the scrappy little NASA-contractor organization packed up their dwindling resources and started climbing out of the deep post-Apollo program budget hole. The climb out was not easy, because the pit was dug for them by others also trying to save their hides from early extinction.[1]

Indeed, the MTF competed with the Marshall Space Flight Center (MSFC) engineers and Edwards Air Force Base (EAFB) backers to snag the prized Space Shuttle Main Engine (SSME) test program, a sustaining propulsion project that would last for decades. Jackson Balch, who developed new and far-reaching interests in the environmental and oceanographic scientific world, knew the Space Shuttle test program was critical to the MTF. It was a

1. James R. Hansen, *Spaceflight Revolution, NASA Langley Research Center From Sputnik To Apollo* (Washington, DC: NASA SP-4308, 1995), pp. 429–431; Jackson M. Balch, *Memorandum for the Record*, "Prepare Downmoding Plan," 13 August 1970; Maria Watson, "Balch Recalls Progress At Hancock Test Facility Site," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 24 July 1975.

source of operating funds to "stay alive" until the fragile MTF scientific center could mature. Without NASA's support, the probability that the small, fledgling federal-state agency associates could last at the remote location on the Mississippi Gulf Coast was highly unlikely.[2]

In this atmosphere of an all-out NASA family feud, a unique multiagency installation blossomed and grew into a stable environmental-oceanographic center, sustained by the thunderous, continued roar of NASA's new generation of rocket engines. Although the new center was growing in many directions, Balch felt helpless in controlling the march toward full utilization.[3]

The Shuttle Decision

Upon joining the MTF team, Roy Estess was assigned the task of putting together and presenting a proposal to perform developmental and proof testing of the SSME at the MTF. Even more importantly, Estess had the personal goal of doing a good job to please Balch, his tough boss. As many who worked for Balch knew, there was no greater pressure than to have their boss watching and waiting impatiently for a "perfect outcome" of an assigned task.[4]

Nevertheless, Estess took his assignment with confident determination born out of his role in the most recent successful testing of the Saturn V second-stage S-II rocket. As an aerospace engineer, Estess had a hard time understanding Balch's lack of enthusiasm for what was destined to be the nation's next major rocket program.[5]

After all, the giant test complex was built, and von Braun had promised to "captive fire large space vehicle systems. . . for the next 25–50 years." If all

2. Roy Estess, interview by Henry C. Dethloff, SSC, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 1991, p. 7, SSCHRC; NASA George C. Marshall Space Flight Center, *America's Space Transportation System,* "The Shuttle Era," and "The Space Shuttle Main Engine" (Washington, DC: U.S. Government Printing Office 740–049/144 Region No. 4, 1977), Stennis Space Center Historical Records Collection, Stennis Space Center, MS, (henceforth referred to as SSCHRC); John Seiley, interview by Johnny Mann and Rex Cooksey, video history, October 1991, SSCHRC.

3. "MTF—Reports Of Its Death Grossly Exaggerated," *The Daily Herald,* 20 August 1972; "Stennis Pledges Greater Utilization For MTF," *The (Jackson, MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*) 20 February 1974; "Balch Leaving NASA, Auter Assumes Post," *The Daily Herald,* 21 July 1975; Kenneth Reich, "Promise Dies—Space Cutback: Instant Poverty For Boom Town," *The Los Angeles Times,* 22 April 1970; John C. Stennis to Bryce Harlow, 4 February 1970, SSCHRC.

4. Estess, interview by Dethloff.

5. Estess, interview by Mack Herring, SSC, 7 July 1995, audio tape in SSCHRC.

went well, the reusable Space Shuttle would be the country's workhorse in space for the foreseeable future. Both the enthusiastic Estess and the reluctant Balch knew that testing the engines for the shuttle would provide the MTF with the "bread and butter" to carry the facility into the future.[6]

To Estess's dismay, Balch announced that he would accompany him to NASA Headquarters on 11 December 1970 for the young engineer's shuttle engine test program proposal to the NASA Site Evaluation Board, known as the "Thompson Committee." On the way to the New Orleans airport for the flight to Washington, Balch asked Estess, "What have you been doing the past year?" Estess replied, "We've put together this presentation," trying to hand a copy to his boss. "I'm not interested," Balch dramatically replied. After a few minutes, Balch asked for a copy and began to read it.[7]

As Balch thumbed the pages of the proposal, he began to "grunt," signaling that he was displeased. When he reached the meat of the presentation, he "shuddered" and shook his head. Balch asked, "What is this?" and "Why do you say this?" During the flight to Washington, Balch's mood got worse.[8]

When the pair arrived at their hotel, Balch declared that the presentation the next day was "going to be a disaster." After being thoroughly shaken by his boss, Estess joined Balch for breakfast the next day in the hotel coffee shop. Not a word passed between Estess and Balch, who was intently reading *The Washington Post*. At the Headquarters, they waited in an anteroom while their bosses from the MSFC gave their pitch. The MSFC presenters emerged from the conference room and glared at Balch and Estess, who were preparing to go in. The MSFC delegation was angry because they asked the Headquarters officials for permission to review the MTF pitch and were denied, nor were they allowed to sit in the conference room while Estess presented his proposal.[9]

Inside, Estess suffered further intimidation, when Balch, taking a chair at the rear of the room, left Estess alone before the formidable NASA managers and their engineering staff at the long, horseshoe-shaped, walnut conference table. Floyd L. Thompson, Site Evaluation Board chairman, came over to

---

6. Estess, interview by Dethloff; NASA-SSC Public Affairs Office, "Roy Estess Biography," 1995, SSCHRC; Roger E. Bilstein, *Stages To Saturn, A Technological History Of The Apollo/Saturn Launch Vehicles* (Washington, DC: NASA SP-4206, 1980), pp. 222–233.

7. Estess, interview by Dethloff.

8. *Ibid.*

9. *Ibid.*

Estess and made him feel welcome, saying in a congenial tone, "Hey, this is a relaxed atmosphere. We just want to hear what you have to say." When the panel began asking questions, Estess felt relaxed for the first time.[10]

Estess's presentation that day included these favorable points: the lowest costs for facility modification and delivery of liquid hydrogen to the test stands; centralized rocket engine capabilities; and use of the dual position B-1/B-2 test stand for orbiter testing and future single-engine needs. The main focus of his presentation centered around the use of the A-1 and A-2 S-II test stands already equipped for liquid hydrogen fuel. Although exact costs were not available at the time of the presentation, the study estimated that the MTF overall costs would be lower than at the MSFC or EAFB sites. Essentially, the MTF test stands needed to be modified "down" to accommodate single engines, since they were used during the Apollo program to test an entire rocket stage with approximately twice the thrust capability of the SSMEs. Estess estimated the test stand modifications at $7.9 million.[11]

The MTF's extensive supporting facilities, test experience, existing acoustic-buffer zone, and community support were factors Estess also pointed to as giving the MTF advantage over the other two sites. In his pitch, the importance of the propellant barges used for transportation and storage; the cryogenic facility; and the high-pressure gas facility were also stressed. The MTF's test experience was another factor Estess highlighted. He reminded board members of the 43 test firings during the Apollo program, with only five aborts. This experience amounted to 2,475 man-years of rocket test experience accumulated by MTF personnel, and no test delays ever occurred due to lack of support services. The 125,442-acre acoustic-buffer zone provided the land needed to absorb the noise and sound-pressure levels that shuttle engines generate.[12]

Estess provided detailed data that dramatically demonstrated the local communities' willingness to support the NASA program. Important to the NASA decision makers were the changes that were made in local area municipal and commercial facilities. For example, the bonded indebtedness in the towns surrounding the Mississippi NASA site increased from $1 million in 1962 to $20

---

10. *Ibid.*; Estess, interview; See Hansen's *Spaceflight Revolution*, pp. 81–85, for biographical description of Floyd L. Thompson. Hansen's sketch does not, however, delve into the Langley director's old-fashioned "gentlemanly" demeanor.

11. Estess, interview by Dethloff; Estess, interview; Roy Estess, "NASA Mississippi Test Facility Shuttle Engine Test Presentation," 11 December 1970, SSCHRC.

12. *Ibid.*

million in 1969. School buildings increased by 40 percent and housing units by 101 percent. The investments by these communities to accommodate NASA now had the opportunity to pay dividends. Estess was able to use up-to-the-minute figures to illustrate that NASA encouraged the communities to make these improvements, a point not lost on officials in the room. As a former center director of the Langley Research Center, Chairman Floyd Thompson had intimate knowledge of the need for community support of governmental activities.[13]

As the presentation went on, the board members asked more questions, but Estess confined his presentation to the allotted time, a little over an hour. At the conclusion, Thompson approached Estess and said, "You've obviously done a great job. We might just tell you we think it's the best presentation we've had out of the three places." Relieved, Estess headed for the door. Balch came up from his seat in the rear of the room and exchanged pleasant good-byes with the members, beaming as if he had given the presentation himself. Balch then slapped Estess on the back and said, "You did a good job." Balch had given Estess the supreme tribute, and that was all the young engineer ever wished to receive.[14]

Unbeknownst to Balch and Estess, they had a "friend" in Washington, one who had the ear of the Site Evaluation Board. Jerry Hlass, the Headquarters manager responsible for construction of the MTF, was working on his master's thesis at George Washington University. His study, "Search For A Role For A Large Government Facility," addressed the question of "what to do about [the] MTF." Hlass, like many others within NASA, knew the Space Shuttle program was the Agency's best chance at a long-range propulsion program. He also knew the site selection process was under way to perform the sea-level testing of the SSME, with a possible adjunct program to static-test a cluster of engines that would power the shuttle orbiter. Although Hlass's thesis included alternative uses of the MTF, such as environmental endeavors, a major portion of his study dealt with his own research on why the MTF should be utilized for shuttle engine testing.[15]

---

13. *Ibid.*
14. Estess, interview.
15. I. Jerry Hlass, interview by Henry C. Dethloff, The Mississippi Oral History Program, University of Southern Mississippi, vol. 437, 1991, pp. 15–22, SSCHRC; I. Jerry Hlass, "Search For A Role For A Large Government Test Facility" (master's thesis, George Washington University, June 1971), pp. 60–75; I. Jerry Hlass, interview by Mack Herring, Long Beach, MS, 14 December 1995.

In his usual thorough and logical manner, Hlass went to great lengths to compare the three test sites under consideration—the MSFC, the MTF, and the Edwards Air Force Base (EAFB). He detailed facilities, costs, and community support, and included comparison charts with matrix diagrams showing pros and cons of the test sites. One chart showed the MTF with nine "value points," while the MSFC and the EAFB had only four points each. Hlass's study concluded that the MTF was the best and most economical place to conduct tests of shuttle engines. With knowledge of Hlass's background, steeped in NASA facilities at the MTF and elsewhere, Hlass's Headquarters colleagues on the board asked for his advice during the selection process. Ultimately, Hlass was named to head the construction program for Space Shuttle facilities nationwide.[16]

On 1 March 1971, the Board announced that the MTF was selected for the "sea-level testing of the rocket engines to power the Space Shuttle." The announcement said that some 1,200 development and acceptance tests, beginning in 1973 and continuing through 1979, would be done at the MTF. After 1979, an estimated 45–50 sustaining engineering tests per year would be conducted on the engines. The announcement was obviously good news, as the Space Shuttle program had a longevity not bounded by a particular mission, such as Apollo. The fact that the shuttle was reusable provided a plus for those who remembered the "throw-away" aspects of the big Saturn V rocket stages, which fell into the oceans after they were spent.[17]

The MTF was now assured of a future in propulsion testing for decades, if President Nixon and the Congress agreed with the NASA planners who were proposing the Space Shuttle as the next logical step after the Apollo program. Another year would pass before the Nixon Administration made a firm decision for NASA to go ahead with the Space Shuttle. In retrospect, it is clear that Nixon's support of the shuttle program was directly connected to his need for support by powerful southern congressional leaders. Their support was needed for obtaining the critical funding for tens of thousands of jobs connected to Nixon's other programs in Congress. After all, the shuttle program would mean some 7,000 jobs, many in the "Deep South" at the same locations that proved so politically rewarding during the Apollo program. The huge aero-

---

16. Hlass, interview.

17. Joe Jones, NASA-MSFC News Release, 1 March 1971, SSCHRC; NASA-MSFC Public Affairs Office, "Space Shuttle Decisions," Response to Queries (RTQ), 15 March 1972, SSCHRC.

space complex in California, where the shuttle would be built, was also critical to the President's political plans. The MTF received additional help in landing the Space Shuttle program from Senator Stennis and other members of the Congress. In fact, it was James C. Fletcher (1919–1991), NASA Administrator, who on 5 January 1972 gave the green light to proceed with the shuttle program. He said Stennis's influence in Congress "saved the shuttle" from being scrapped by the budget-conscious Congress.[18]

Many believe the decision to bring the shuttle program to the MTF in 1971 was the most crucial single event in the center's entire history. According to Roy Estess, in the end, the MTF ". . . was the best place to do the job." Furthermore, Estess maintained that one could not ". . . discount politics; John C. Stennis cast a long shadow in those days."[19]

$10 Million Set-Aside

While awaiting the outcome of the Space Shuttle site-location decision, the eyes of NASA-MTF and the Headquarters managers turned to Capitol Hill, as debate over a $10 million set-aside fund heated up. Senator Ellender of Louisiana and Senator Stennis introduced a bill in the Appropriations Committee in the summer of 1970 to "set aside" funds from NASA's appropriations for research and program management (R&PM). The funds would be used at the MTF and the Slidell Computer Complex preparing the facilities to accommodate environmental programs. Actual use of the funds was held up in 1971 when Nixon vetoed the entire Independent Offices and Department of Housing and Urban Development Act—the source for NASA's funding.[20]

---

18. Roger Launius, "NASA And The Decision To Build The Space Shuttle, 1969–1972," *The Historian*, p. 57 (Autumn 1994); Wilbur B. Breuer, *Race To The Moon, America's Duel With The Soviets* (Westpoint, CT: Praeger Publishers, 1993), p. 202; Frank Macomber, Copley News Service, "Ford Defended Space Program," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 19 October 1974; Ted O'Boyle, "Space Shuttle Plan To Help Test Facility," *The Daily Herald*, 6 January 1972; Jonathan Spivak, "Space Agency May Shun Cape Kennedy Site, Launch $6 Billion Space Shuttle Elsewhere," *The Wall Street Journal*, 3 December 1970.
19. Boyce Mix, interview by Mack Herring, SSC, 16 January 1996; NASA-MSFC News Release, "Shuttle Facts," 1974, SSCHRC; Estess, interview.
20. NASA Headquarters, Office Of Legislative Affairs, "Senate Debates 1971 Second Supplemental Appropriations," vol. X, no. 46, 18 May 1971; Congressional Record Senate (Washington, DC: S-7052, 17 May 1971), pp. 3–6; "Bill Would Give MTF $10 Million," *The Clarion-Ledger*, 10 December 1970; "Bill Will Provide Test Facility Funds," *The Birmingham (AL) News*, 9 December 1970.

On 16 February 1971, George Low, acting NASA Administrator, wrote a memorandum outlining Agency policy for using "wisely and expeditiously" the $10 million set-aside funds from fiscal year 1971 R&PM appropriations. The memorandum was distributed to Eberhard Rees, director of the MSFC in Huntsville, Alabama; Robert Gilruth, director of the Manned Spacecraft Center (MSC) in Houston, Texas; Robert Piland, director of the Earth Resources Laboratory; and Balch, manager of the MTF. The memorandum also went to key Headquarters officials such as William "Bill" Lilly, Office of Manned Space Flight (OMSF) comptroller. The set-aside funding bill of Ellender and Stennis angered NASA managers nationwide, since the funds were taken from salaries and operating costs Agencywide. Low's memorandum attempted to dictate use of the funds, saying that monies included in the MTF proposal represented increases in capital assets at the MTF, and, as such, fell outside congressional intent. In truth, the MTF did plan to use most of the funds to build specialized laboratories and facilities to accommodate and attract environmentally oriented agencies. Among the projects planned were an indoor hydroscience facility, outdoor flood plain, chemical laboratory, and giant fish tank. These projects were designed to help the MTF and Slidell Computer Complex prepare for environmental work.[21]

When the Low memorandum dictating use of the set-aside funds was received, an unknown recipient forwarded copies to Stennis and Ellender, who were angered at the actions of NASA Headquarters and, most especially, George Low. In fact, the Senators were so upset they fired off an "official night letter" telegram on 20 February 1972 to Low. The telegram began, "To our dismay we have just learned that NASA decided to re-examine and to redesign several aspects of the plan for expenditure of the $10 million set-aside for movement of various environmental and space missions to MTF/Slidell." The message then went on in terse and brawny terms saying, "It would be a tragedy if, as a matter of policy, NASA were to place so severe a straitjacket on the funds as to forestall the very alterations by which the basic institutional and technical services of which the legislation speaks can be offered to the

21. Memorandum, George M. Low to Associate Administrator For Manned Space Flight, "NASA Policy On The $10 Million Set Aside For The Mississippi Test Facility," 18 February 1971; Telegram, Harry H. Gorman to Eberhard F.M. Rees, "$10 Million Set Aside For The Mississippi Test Facility," 18 February 1971; Telegram, Allen Ellender and John C. Stennis to George M. Low, 20 February 1971; Memorandum, Willis H. Shapley to Associate Administrator for Manned Space Flight, 21 February 1971.

[Environmental Protection Agency (EPA), National Oceanographic and Atmospheric Administration (NOAA), United States Geological Survey (USGS), and NASA]." The telegram concluded by "urging" Low not to place an overly restrictive interpretation on "our" set-aside amendment.[22]

On 24 February, Willis H. Shapley wrote a memorandum to the Associate Administrator for the Office of Manned Space Flight at NASA Headquarters, the office that governed the MSFC and the MTF within the chain of command. The memorandum urged prompt initiation of the approvals needed for the proposed MTF environmental projects. Shapley directed that the requests be processed through channels as "expeditiously as possible." NASA seemed caught between trying to deal with the maverick MTF organization, within its traditional chain of command, and Senators Ellender and Stennis. NASA's urgent need to secure support in the Congress for the proposed Space Shuttle and other programs that faced possible elimination or serious cuts, complicated their resolution of the "MTF problem."[23]

To make sure no further delays, restrictions, or misinterpretations of their legislation occurred, Ellender and Stennis added "clarifying language" in the set-aside appropriations bill to remove any question regarding NASA's authority to accomplish the projects needed at the MTF. In addition to the new language, the Senators also extended the time constrictions during which the funds could be obligated for the facility to 30 September 1971.[24]

Recycling The Missile Base

Once the set-aside controversy was settled, Balch and the MTF engineers used their skills to help the new research scientists build the promised laboratories. The engineers and scientists formed an interesting team. The government agency scientists knew the kinds of laboratories they needed, but had no idea how to build them. On the other hand, the NASA engineers had proven themselves by building the unique test facilities in the Mississippi

---

22. *Ibid.*
23. Memorandum, Willis H. Shapley to Associate Administrator for Manned Space Flight, 21 February 1971.
24. Senator Ellender, May 1971, on the Senate floor read letters, detailing plans and projects needed at the MTF, from Robert M. White, NOAA administrator, and William D. Ruckelshaus, EPA administrator, *Congressional Record*, S7052, 17 May 1971, pp. 3–5.

swamp, but had little knowledge of the environmental sciences. Working together, both scientists and engineers created a hydraulics laboratory in a warehouse; a remote sensing fisheries impoundment facility in the S-II vertical checkout building; a marine, atmospheric, and environmental laboratory in the Component Test Facility building; and an outdoor flow basin and flood plain simulation facility from the spill-off water system of an S-II test stand.[25]

The new work for the idle MTF engineers was welcomed by many, but some found the relationship with their strange new science partners not as satisfying as testing the giant Saturn rockets. Doug McLauglin, North American Rockwell test engineer, found himself building boat docks for use by Mississippi State University and Louisiana State University personnel to perform ecological studies along the Pearl River. Boyce Mix, assistant manager for the S-IC test program, studied environmental science and made trips to the Atchafalaya Swamp, Louisiana, to tend ground-truth data platforms. Ted LaMunyon stayed busy going on "acquisition trips" around the country, which included going to the Kennedy Space Center (KSC) for pipe and railroad tracks and to the University of Miami for a surplus boat that was traded for a much-needed satellite receiving dish.[26]

Several test engineers found employment with the new onsite scientific agencies, contributing their firsthand knowledge of the MTF and expertise in engineering. Robert Piland appointed Wayne Mooneyhan as deputy of the new Earth Resources Laboratory, and Alex Peresich joined the laboratory's staff. Glade Woods and Walt Gandy joined the National Marine Fisheries Service (NMFS). O.J. Howe, General Electric (GE) engineer, went to work for the National Data Buoy Program office. Many other skilled and talented GE contractor personnel assisted the new agencies.[27]

---

25. Boyce Mix, interview; A.J. "Jack" Rogers, Jr., interview by Mack Herring, SSC, 8 December 1994; Jackson M. Balch, interview by Gateway Productions, 10 December 1974, audio tape in SSCHRC; Jackson M. Balch to Governor John Bell Williams, 28 June 1971, SSCHRC; Jackson M. Balch to James T. Shepherd, "New MTF Charter," 14 January 1971; Jackson M. Balch, testimony before the Senate Judiciary Committee, S-9007, "A bill to consent to the Interstate Environment Compact," 21 April 1971, SSCHRC.

26. Mix, interview; Ted LaMunyon, interview by Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 409, 1992, pp. 20–22, SSCHRC; Ted LaMunyon, interview by Mack Herring, Picayune, MS, 16 January 1996.

27. E.G. "Glade" Woods, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 435, 1 December 1992, pp. 7–8, SSCHRC; O.J. Howe, interview by Mack Herring, Waveland, MS; NSTL Capabilities Document, "Configuration of NSTL, and Earth Resources Laboratory," SSCHRC, pp. 6, 46.

In a major effort to make the new tenants, or "resident agencies," welcome and to get them acclimated as soon as possible, Balch offered his NASA personnel's expertise to assist the newcomers. He formed a Project Liaison Group and placed his Facilities Office Chief, A.J. "Jack" Rogers, Jr., in charge. Balch also offered the resident agencies assistance in contracts, legal, public affairs, and financial management services. The majority of the time, the MTF manager gave freely of his resources and kept his hands out of the "programmatic" pursuits of the agencies. Balch, however, did exercise his landlord rights when issues involved the entire facility.[28]

On numerous occasions, Balch called the heads of the agencies to the main conference room to host and impress a "prospective" newcomer. Balch would proudly go around the table introducing the agency heads, calling out their titles, "This is Dr. Han Tai, director of the [onsite EPA] office. . . and this is Mr. Stevenson, director of the National Marine Fisheries Laboratory." If Balch did not think a title was sufficient to impress a guest, he embellished it. He was well known for conferring advanced degrees on people "on the spot." He did not think twice about escorting an important visitor into the laboratories or offices of the agency chiefs to show off the new MTF environmental cooperative. When he was tied up, Balch delegated the task to people in his organization who he believed had good technical knowledge, but more importantly, had "social graces" and were able to impress and dazzle visitors with their personality. When they were escorting visitors, Balch admonished his lieutenants to "just flash the office, step into the door, wave your arms, and move on. Don't let them see inactivity or question you about details. Make them believe there is a lot of diverse and important work going on."[29]

In truth there was a lot of work going on, as the transition from "a single-mission, space-dedicated, production-type installation into one having many missions of research, development, and operations in both space and environmental activity" accelerated at the MTF. In fact, Balch proudly boasted to Mississippi Governor John Bell Williams in June 1971 that the "new MTF" concept was still in an experimental phase, but its validity was being "demonstrated each day." In Balch's battle cry for "full utilization," he called on the

---

28. A.J. "Jack" Rogers, Jr., interview by Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 386, 1991, pp. 16–18, SSCHRC; Director's Office Files, "Activities In Residence At Mississippi Test Facility," meeting agenda on overall situation at MTF, ud., circa 1973.

29. Estess, interview by Mack Herring, SSC, 7 July 1995.

Governor to join him in developing the "new MTF" by stressing that ". . . the opportunity exists now for the development of federal-state communication in the very complex world of environmental management to a degree not previously possible."[30]

At the time Balch was urging Governor Williams to actively join the MTF effort, divisions of the following agencies were already on site or were firmly committed to join the MTF consortium. These included the Department of Interior's USGS and the Earth Resources Observation Systems (EROS) regional office; the Department of Commerce's NOAA National Data Buoy Program Office, Remote Sensing Engineering Development Office, the Experimental Field Test and Integration Center, and the National Oceanographic Instrumentation Center.[31]

Also committed to the MTF consortium were the EPA's National Pesticide Monitoring Laboratory, National Pesticide Chemical Regulation Laboratory, and the Water Quality Laboratory for the Lower Mississippi River Basin; NASA's Earth Resources Experimental Laboratory, MTF (host agency), Manned Spacecraft Center, and the MSFC; the Department of the Army's Munitions Command Hazards Evaluation Office; and Mississippi State University and Louisiana State University (both under contract or grant).[32]

Although the new agencies began sending advance personnel to the MTF, the total population of the site, which was more than 6,000 in the summer of 1965, had dropped to slightly more than 900. Most testing personnel went to work for the site support contractors, the new agencies, or sought employment in the local communities. Jobs in the aerospace industry were scarce everywhere because of the nationwide cutbacks occurring in the NASA program. Many rocket engineers were unable to find jobs even when they presented their specialty experiences and credentials obtained while testing rockets at the MTF.[33]

---

30. Jackson Balch to Governor John Bell Williams, 28 June 1971. This letter, authored by Balch, contained a good explanation of Balch's philosophy and an account of activities under way at the MTF. The letter to Williams is a valuable document because Balch explained his intentions for the space-environmental complex in a written document rather than at a chalkboard, where it could be erased.

31. *Ibid.*

32. *Ibid.*

33. Blanch R. Robinson, "NSTL Personnel Strength," 1975, SSCHRC. Of all records pertaining to the roller coaster fortunes of the MTF, actual personnel records tell the story most accurately. One can trace a high of over 6,000 people working at the MTF, summer of 1965, to a low of about 900 employees in 1971. Portions of these personnel records can be found in SSCHRC.

Steel City

With the transition from rocket testing to space and environmental research under way, Balch and his staff continued searching for additional resident agencies. In at least one instance, however, their "fishing expeditions" for new business hooked an unwelcomed tenant. In the spring of 1971, the U.S. Army was engaged in a 12-year ammunition production modernization program. The classified program was code-named "Steel City." Senator Stennis, as chairman of the Senate Armed Services Committee, heard about the Army program and learned that the plans called for a large ammunition manufacturing complex.[34]

Stennis suggested the Army consider locating at Camp Shelby, an Army installation south of Hattiesburg, Mississippi—about 60 miles north of the MTF. However, the Army Corps of Engineers, advised the Army site-selection personnel to look at the NASA installation. On 16 April 1971, when the Army advance team was escorted to the MTF by the Corps of Engineers, a "love-hate" relationship began between NASA, Senator Stennis, and the U.S. Army ammunition plant.[35]

With the new space and environmental concept beginning to flourish at the MTF, Balch felt his "marketeers" could be "selective" in their search. He wanted agencies that were compatible and would not overwhelm the smaller agencies with size or federal funding. The Army's Steel City complex, with its main mission to manufacture a modern version of the 155-millimeter artillery round, was clearly not compatible with organizations trying to save the planet from environmental pollution and those conducting science "for the benefit of mankind."[36]

The Army envisioned the huge manufacturing complex costs at $500 million, with employment of approximately 1,200 people, a mammoth undertaking that Balch thought could easily "overwhelm" the work of the smaller onsite MTF agencies. Privately, Balch feared that once Stennis landed the big Army plant for the MTF, the Senator would lose interest in

34. Department of the Army, memorandum, "Availability of Land and Facilities at NASA Mississippi Test Facility," 23 July 1971, SSCHRC; R.H. Curtin, *Memorandum for the Record*, "Possible Use Of MTF For Army's Steel City," 14 February 1973.

35. NASA-MTF Director's Files, "Factors Concerning Steel City At Mississippi Facility, 1 February 1973, SSCHRC.

36. Harry Owen to Governor Bill Waller, 29 December 1972, SSCHRC.



Aerial view of the Mississippi Army Ammunition Plant (MSAAP) at the National Space Technology Laboratories (NSTL) just prior to the plant's dedication on 31 March 1983. (SSC-88-350-134)

supporting the MTF space and environmental concept. Balch also felt the plant would bring "blue collar" jobs, which would not be a good mix with the advanced-degree scientists working for the smaller onsite agencies.[37]

The Army found the MTF location attractive, especially since the northern half (7,000 acres) of the "fee" area was available. The Army would have preferred to "swallow up" the MTF activities and even said the SSME testing program could "possibly" be moved to Merritt Island, Florida. NASA, however, had already made its decision to test the SSMEs at the MTF. The Army wanted to obtain Stennis's blessing and locate its plant at the MTF and, in doing so, secure necessary funding from the Senate Armed Services Committee—chaired by Stennis.[38]

37. *Ibid.*; Also see "Factors Concerning Steel City At Mississippi Test Facility," point "10," where several negative reasons are listed regarding construction of the Army plant at the MTF.

38. U.S. Army Munitions Command, "Feasibility Study, Mississippi Ammunition Complex, Mississippi Gulf Coast," 28 May 1971, SSCHRC.

Balch, focusing his energies on putting his own NASA house in order, persuaded Dr. George Constan, former manager of the Michoud Assembly Facility, to help him in a number of managerial tasks. Constan, serving as liaison to the Army and NASA Headquarters, handled the details concerning the location of the huge munitions facility. Balch also appointed Doug Howard to serve as "project officer" to follow the project with Constan.[39]

Managing The Change

As the MTF environmental complex materialized, Balch made his own organization more compatible with the multiagency concept. Although his personnel often made light of Balch's many organizational changes, adjustments were necessary for meeting the demands placed on NASA by the many diverse tenants.[40]

One of the first adjustments was to change the contractual nature of the installation. During the rocket-testing years, GE was the only MTF support contractor, handling both technical support and site maintenance chores. Balch and members of his staff thought the $64 million GE contract during the Apollo program was too big and expensive for the new multiagency arrangement. They felt that multiple contractors might be more attentive to the new agencies.[41]

Since Balch was happy with the superior technical support available from GE, he decided to just split the GE contract into two parts, a general site maintenance contractor and a technical support contractor, to assist NASA and the new agencies. The two contracts were intended to minimize GE's responsibilities, and, therefore, allow for certain needs to be met by means of "specific task" contracts. The site maintenace (institutional) contractor was "site operator," supporting facility maintenance and plant engineering. The MSFC agreed to the overall concept and encouraged the MTF to make these changes. In many instances, Balch favored the sophisticated contractors over his own

39. When Jackson Balch found that Senator Stennis was determined to support the Army's plans to build an ammunition plant on the northern part of the MTF, he supported the move. To do so, Balch helped develop an environmental impact study and encouraged community and media support.

40. Jackson Balch, *Memorandum to Office Chiefs*, "Reorganization Planning," 28 December 1971, SSCHRC.

41. *Ibid.*

civil service staff. The reorganization kept an experienced, technical agency available for use, in lieu of the traditional civil servants.[42]

Global Associates of Oakland, California, was awarded the Operating Services (site maintenance) contract and began working at the MTF on 12 July 1971. GE went to work under its new "Technical Support Services" contract on 1 August 1971. The GE contract included support for engineering services, data testing and instrumentation, and the scientific laboratory personnel. Both contractors were required to be responsible to the resident agencies, as well as NASA.[43]

During this period of readjustment, the MSFC elevated the MTF's position, giving Balch a direct line to the MSFC director and changing Balch's title from manager to director. This move was done partially because the MSFC felt the MTF needed the new status designation to better cope with its new concept; also, the MSFC acted at the insistence of Senator Stennis, who wrote to NASA complaining that the "MTF was inhibited to function properly" because of "layers of bureaucracy." MSFC Director Eberhard Rees wrote to NASA Administrator Fletcher, recommending the change in status and asking Fletcher to call on other federal agencies to join the MTF consortium. Rees, Balch's former MSFC boss and his friend, recognized the political as well as the scientific possibilities of the growing complex. Rees also had an idea that the SSME testing would occur at the MTF in the not-too-distant future. Prior to 11 May 1972 and the approval of the MTF's new charter, Balch would communicate with the MSFC Industrial Operations office on most issues, but some were reserved for direct communication with the MSFC director.[44]

With the new charter, Balch styled the space and environmental complex to interact with the resident agencies and operate with its own "project office," which he called Applications Engineering (AE). He also formed an "Installations Operations" office. Balch asked William L. "Bill" Grafton, a respected engineer, to help organize the AE project office, and Waldo Dearing, Balch's chief administrator, to help organize the Installation Operations office.[45]

---

42. *Ibid.*; Dr. F.S. Schultz to Jackson Balch, 3 January 1972, SSCHRC.
43. W.H. "Waldo" Dearing to J.N. Foster, "Revised Summary Listing Of MTF Contract Activities," 21 November 1972, SSCHRC.
44. MSFC, "MTF Charter 0501," 28 December 1971, SSCHRC.
45. MSFC, "MTF Charter 0502," 11 May 1972; Balch, *Memorandum to Office Chiefs*, 28 December 1971.

Balch wanted his onsite NASA organization to be the focal point of MTF interaction with all federal and state agencies resident at the MTF and the Slidell Computer Complex. He also felt that the AE office should provide the channel by which space technology could be applied to the work of the resident agencies. He deeply felt that the MTF could be of service to NASA and the nation by demonstrating to "the world" the uses and importance of space technology. By having the AE office actively operating in a "marketplace" of science, Balch thought a synergism would take place and research could cross bureaucratic, governmental, and disciplinary lines.[46]

Indeed, the AE mission was to (1) engage in projects to demonstrate space applications of NASA technology; (2) manage accomplishment of selected tenant-assigned projects and experiments; and (3) seek appropriate arrangements with other NASA centers to involve NASA-wide experience at the MTF. Balch felt so strongly about the AE mission that he assigned Henry Auter to serve as AE director and several of his best engineers and NASA "university-educated" scientists to work in the office. As a result, AE was divided into three elements: Technology Transfer and Utilization, headed by Roy Estess; Technology Applications, led by Larry Hopkins; and the Environmental Systems Development Team, directed by Dr. William "Billy" Wolverton. Others assigned to AE were Ken Daughtrey, John Ivey, Robert "Bobby" Hegwood, Robert "Bobby" Junkin, Lelyn Nybo, Rebecca "Becky" McDonald, and William "Bill" Montgomery.[47]

An innovative management tool devised by the Balch team was the MTF method of recovering costs incurred by the resident agencies. NASA Headquarters was concerned about the "accounting" process from the very beginning. Although all federal agencies, and even state agencies to some extent, were part of the same federal system, congressional funding, in addition to national and state laws, applied to the accountability of public funds used at the MTF. The managers of the new onsite agencies were promised that their tenancy at the MTF would "save money," and they could put most of their funding into scientific programs and not into expensive facility operations.[48]

---

46. *Ibid.*; Applications Engineering, NSTL Capabilities Document, "Configuration of NSTL," p. 6, and "NSTL Industrial Community," p. 10; November 1975.
47. *Ibid.*; Applications Engineering, NSTL Capabilities Document, 10 November 1975.
48. I. Jerry Hlass, *Management Concept and Structure of the John C. Stennis Space Center, a Multiagency Federal Laboratory*, (SSC, MS: Graphic Arts Department, 1995), pp. 10–16.

Balch and his financial managers spent many hours determining a fair and equitable system for recovering and sharing the costs of exploring science. The system they devised charged resident agencies for the additive costs associated with their tenancy and their particular type of work. With this system, agencies were only charged for the added costs that NASA would not have incurred as the sole MTF occupant. With relatively small-sized agencies participating, these charges seemed appropriate for the tenants, as well as NASA. As the number and size of the agencies grew, the charge system came under fire from other agencies, NASA Headquarters, and even a congressional investigative committee.[49]

The Restless Warrior

One of Balch's personality quirks did not allow him to ever let business matters "settle down" for long. One might argue, however, that the creation of the multiagency governmental complex in remote Hancock County in southwest Mississippi required the continuous and arduous work of Balch. After all, the experiment was undertaken far from any technological complex, such as the Research Triangle Park in North Carolina.[50]

Balch cultivated yet another political ally, Senator John L. McClellan (D-Arkansas), chairman of the Committee of Governmental Operations and a ranking member of the Appropriations and Judiciary Committees. McClellan extended an invitation to Balch to come to Washington and give testimony before the Senate Judiciary Committee in reference to a bill allowing for an Interstate Environment Compact. Balch seized the opportunity, hoping that exposure before the senate committee would further the cause of the MTF. Arkansas was part of the MTF federal-state structure because of "shared interests" with Mississippi and Louisiana. Arkansas Governor Dale Bumpers took a special interest and introduced the programs to his political allies.[51]

49. *Ibid.*

50. Senator John L. McClellan to Jackson Balch, 27 April 1971; Congressional Record, 92nd Congress, vol. 117, 23 February 1971; Michael Barone, Grant Ujifusa, and Douglas Matthews, *The Almanac Of American Politics*, 1972, pp. 31–33;

51. *Ibid.*

Balch took annual leave on 21 April 1971, the day of the senate committee meeting, so the personal views he would be expressing could not be questioned by his NASA bosses. He even told the Committee he was testifying as a "private citizen," surprising McClellan and other committee members, who thought he was there as a government representative. Balch used a chalkboard, a Balch presentation trademark, to illustrate his points. McClellan warned Balch, in a jovial way, that his marks on the board might not be recorded properly for the record.[52]

Balch went on with his presentation to the Committee, using the chalkboard just as he had many times in his own office. He pointed out the need to monitor and inventory the environment, and he alerted the Senators to the problems government agencies addressing these environmental matters had in "communicating" with each other. He also used the opportunity to explain to the congressional panel how well the various agencies at the MTF worked together in sharing information. He emphasized the point that the same system of cooperation could be applied in other parts of the country, covering the nation with installations that could exchange useful information. Balch stressed that environmental information needed to be developed in an atmosphere where an "alderman in Pass Christian, Mississippi," could use data produced from technology developed by federal and state agencies to make decisions in his own hometown. The most important aspect of his appearance before the Judiciary Committee came from the realization of his critics that he would take his case to the highest places in the land.[53]

After the Washington presentation, Balch brought in state officials from Arkansas as part of what became a tri-state consortium for environmental research. He gained assistance from another new political supporter, U.S. Representative Trent Lott, a Republican elected to the House of Representatives to fill a vacancy left by the retirement of Bill Colmer in 1972. Lott was no stranger to the MTF, becoming familiar with it as Colmer's administrative assistant. Lott had personal friendships with a number of the federal agency heads and employees, and he shared "ownership" status of the MTF since his hometown was on the Mississippi Gulf Coast in Pascagoula.[54]

---

52. Congressional Transcript, The Senate Judiciary Committee, "Statement of Jackson Balch, Manager, Mississippi Test Facility, National Aeronautics and Space Administration," 21 April 1971, SSCHRC.
53. *Ibid.*
54. Office of Senator Trent Lott, "Trent Lott Biography," Washington, DC, 1995, SSCHRC.

Space Shuttle Approved

The slowly developing space-environmental structure at the MTF was bolstered when President Nixon announced his plans to go ahead with a $5.5 billion program to develop the Space Shuttle. Although the January 1972 announcement was made by Nixon at his Western White House in California, a state with a dense concentration of aerospace industries, the benefits were strongly felt at the NASA test site in Mississippi where the new Space Shuttle engines were scheduled to be static-fired. NASA had already made an internal decision in March 1970 to perform the shuttle testing at the MTF. Nixon's decision also meant that the giant external Space Shuttle fuel tanks could be manufactured at the Michoud Assembly Facility (MAF) in New Orleans, a super economic boost for the Gulf Coast area.[55]

As plans for the new Space Shuttle unfolded, NASA Administrator Fletcher visited the MTF in March of 1972, met with Balch, and commented on the MTF's future as a shuttle test site and on the importance of the environmental research under way. In a speech at Stennis International Airport in Hancock County, Fletcher predicted that shuttle testing would only bring in about 200 new jobs, a smaller number than the previous projections of approximately 800–1,000 jobs. He said space would not be "de-emphasized" by NASA, but he observed that a main purpose of the MTF would be to explore the Earth's resources for new uses by man.[56]

Less than a month following Fletcher's March visit, NASA Headquarters announced on 20 April 1972 that the Space Shuttle would be powered by solid rocket motors, as well as liquid-fueled engines. The decision meant that the boost phase of the shuttle would be propelled by simultaneous operation of its solid propellant motors and the high-pressure, liquid-oxygen and liquid-hydrogen main engines attached to the orbiter craft. Since NASA's internal selection of the MTF for testing the main engines, the Space Shuttle's engine configuration definition ensured a good piece of the reusable spacecraft

---

55. "Nixon Orders Go For Space Shuttle," *The Clarion-Ledger*, 4 January 1972; NASA-MSFC News Release, 1 March 1972, SSCHRC; "Ford Defended Space Program," *The Times-Picayune*, 9 October 1974. All the testing plans were subject to congressional approval and funding. See Roger Launius's article, "NASA And The Decision To Build The Space Shuttle," *The Historian*, vol. 57 (Autumn 1994), for an excellent presentation of the political and economic ramifications of the Space Shuttle decision.

56. "Engine Testing Next On Test Site Agenda," *Picayune Item*, 24 April 1972; "Environmental Research Seen For MTF," *The Times-Picayune*, 25 April 1972.

action for the Mississippi site and left the door open for possible manufacture and test of the solid rocket motors. NASA also announced its decision to place program management with the MSFC, giving them responsibility for development, production, and delivery of the main engines, solid rocket motors, and external tanks.[57]

With Balch's main interest in environmental and space application programs, the MSFC set up a small Space Shuttle resident office at the MTF to manage the test program, with no protest from the MTF director. Balch was content to have the program managed by the Shuttle Engine Program Office in Hunstsville, Alabama, with the MTF playing a lesser, but important, test support role. Robert "Bob" Bush, who successfully managed the S-II test program during the 1960s, was named the MTF test program resident manager. Boyce Mix, who served as assistant S-IC manager during the Saturn V testing, was Bush's deputy. Joining Bush and Mix were Ted LaMunyon, Bill Spradlin, Jim Taylor, and Doug Howard. The office officially began operations on 17 July 1972.[58]

An important part of the MTF facility maintenance support contract with Global Associates was a special Space Shuttle support element headed by Doug McLaughlin, formerly in charge of the North American Rockwell group at the MTF. Other experienced Saturn test program engineers on McLaughlin's staff were Patrick "Pat" Mooney, J. Stephens "Steve" Dick, and David Caldarelli. The Global organization responded directly to Bush and the MSFC resident office and was responsible for activation, maintenance, and test support operations. The group received high marks for its performance from the MTF management organization, as well as from the MSFC resident office.[59]

Two "different worlds" existed at the MTF when the shuttle program began in the early 1970s. Colorful signs went up at the gates to the test complex that read "NASA's George C. Marshall Space Flight Center, Shuttle Test

---

57. Jim Lambert, Jr., "Viewpoint," *Picayune Item*, 24 April 1972; Eberhard Rees to Dale Myers, "Selection of Test Sites For Inclusion in the Space Shuttle RFP," 11 February 1972.

58. Jackson M. Balch and J.T. Shepherd, "Memorandum of Agreement Between The Mississippi Test Facility and Program Management (MSFC)," 8 October 1971; Henry F. Auter, *Memorandum for the Record*, "Meeting With William Brown, Engine Program Manager," 28 October 1971; Boyce Mix, interview by Mack Herring, SSC, 19 January 1996; Jackson M. Balch, *Memorandum for the Record*, "NSTL-MSFC Readiness Review," 18 November 1974, SSCHRC; Jackson M. Balch to James T. Shepherd, "New MTF Charter," 14 January 1971.

59. Doug McLauglin, interview by Mack Herring, SSC, 18 January 1996; Bill Spradlin, interview by Mack Herring, SSC, 19 January 1996.

Complex." The engineers in the shuttle complex were overjoyed to be back in the business of testing rockets. The scientists, with the NASA Manned Spacecraft Center, ERL, and other resident agencies, meanwhile, were busily engaged in innovative research in space applications and environmental research. The facility was growing again with "shuttle and science" producing an energy-charged atmosphere of excitement.[60]

Synergism At Work

After years of waging an unrelenting campaign to establish a "scientific utopia," Jackson Balch's impossible dream became a reality. By the end of 1972, a number of federal and state agencies were at the MTF, pooling their talents and resources on programs of mutual interest. Although relatively small in employee numbers, the resident offices at the MTF were national and regional in scope, and most were engaged in scientific research to study and protect the environment, a prominent issue on the nation's agenda.[61]

By spring 1973, in addition to NASA, 16 federal and state agencies and a universities were in residence at the MTF. They represented the Department of Commerce (DOC), the Department of Defense (DoD), the EPA, the Department of the Interior (DOI), State of Mississippi, Louisiana State University, and Mississippi State University. These cabinet-level agencies and state institutions had located elements at the MTF and were using satellite data, airborne sensors, automated ocean buoys, laboratory instruments, computers, and other scientific devices especially designed and built at the Mississippi facility to study their space-, ocean-, and Earth-oriented projects.[62]

As Balch predicted, during his struggle to bring the varied elements to the MTF, both chiefs and employees spent many hours discussing the possibili-

60. Roscoe Nicholson told the author during informal discussion in the SSC barber shop just before Nicholson retired in 1988, "We have two different worlds here [on site]; we don't keep up with the politics. We leave that up to you guys over there." Nicholson was speaking of the great differences in the preoccupations of rocket testing personnel in the Test Complex and the daily administrative work carried on in the Laboratory and Engineering Complex. This division of work at the SSC was even more apparent when the oceanographic and environmental agencies were in their infant stages in the 1970s.; NASA MTF, "Pocket Wallet Facts, ud., circa 1972.

61. See "The New MTF," 1973, from the Auter Collection at SSCHRC for an excellent study of the MTF philosophy.

62. Executive/Directors Files, "MTF Mission Assignments Of Agencies In Residence," 23 April 1973, SSCHRC.

ties of joint projects to help each other in their research endeavors. Representatives of NOAA, the State of Louisiana, Mississippi State University, EPA, Department of the Interior, and NASA regularly gathered after work to compare notes. Often from these informal exchanges came joint programs sharing expertise and technologies.[63]

One of the many cooperative investigations by the MTF space-environmental consortium was the Skylab Oceanic Gamefish Project carried out by NASA and NOAA in August 1973. The purpose of the oceanographic fact-finding mission was to relate stocks of sport fish, such as marlin and sailfish, to ocean features detected by advanced sensors carried aboard orbiting satellites and specially equipped aircraft. NASA's ERL and NOAA's National Marine Fisheries Service Engineering Laboratory, both located at the MTF, collaborated on the highly visible project. Skylab was America's first space station, using a spent S-IVB stage as a laboratory housing the astronauts and approximately 50 experiments. An advanced multispectral scanner onboard the Skylab conducted a number of Earth resources experiments in agriculture, oceanography, hydrology, geology, and geography. William "Bill" Stephenson, head of the NOAA fisheries laboratory, was principal investigator for the project. The mission was launched by a Saturn V rocket using S-IC and S-II boosters static-fired at the MTF. For the first time, the MTF had a role in a spaceborne mission.[64]

The project was conducted in the northeastern Gulf of Mexico with NASA and NOAA directing over 100 volunteer charter fishing boats. "Sea truth" information was gathered by the boats as the big Skylab, with its sophisticated Earth resources sensor, recorded data as it flew over its Gulf of Mexico target. The Skylab measurements were complemented by data from the NOAA-2 satellite, two NASA aircraft with sensors—flying at altitudes of 10,000 and 20,000 feet, and nine instrumented research vessels operating in the Gulf. The Skylab Oceanic Gamefish Project demonstrated how elements of the federal government could work with private entities such as charter boat fishermen to gain useful scientific information for the "user" community. Studies con-

---

63. Captain Peter A. Morrill, interview by Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 442, 1993, pp. 9–11, SSCHRC.
64. NASA-NOAA Joint News Release, "Skylab Astronauts, Fishermen Join In Ocean Game Fish Experiment," 24 July 1973, SSCHRC; "Record Number Of Sport Fishing Boats Expected To Take Part In Skylab Project," *The Daily Herald*, 4 August 1973.

ducted afterward showed that gamefish could be tracked using combined space and ocean data.[65]

Many other projects combining the use of satellites, aircraft, and earth-based data were conducted by the MTF agencies. ERL worked with the states of Louisiana and Mississippi, local universities, and, in some cases, local communities conducting research investigations in the application of remote sensing to resource management. The ERL also developed techniques and sensors that gained national and international attention in the field of remote sensing. The "Lab," as the organization was called, also cooperated with the DOI Earth Resources Observation Systems (EROS) office at the MTF. The EROS office was directed by Gary North, a young manager who became a favorite of Jackson Balch. Robert Piland, having organized the ERL, turned the reins of the laboratory over to Wayne Mooneyhan. The National Park Service found satellite-derived information invaluable in its inventory programs of the national parks and its study of the stresses people inflict on park ecosystems. Dr. Garrett Smathers, director of the Park Service's element at the MTF, had as many as 33 onsite scientists. The National Weather Bureau's Lower Mississippi River Forecast Center, directed by the respected Clarence Vicroy, settled in the Slidell Computer Complex, using computerized digital simulation models and satellite and aircraft data to better predict flooding.[66]

Some agencies at the MTF pursued projects that daily affected people and institutions around the nation. The EPA's Pesticide Monitoring Laboratory analyzed soils, agricultural crops, and wildlife samples from all 50 states. The laboratory also developed new techniques using aerial and satellite-observed data in its program. EPA Laboratory Director Dr. Han Tai was internationally known for his creative work in the field. The NOAA Data Buoy Program Office developed and deployed instrumented buoys to measure oceanographic and meteorologic parameters in the Gulf of Mexico and along the Atlantic and Pacific coastlines. These buoys telemetered data back to the mainland via communications satellites. Captain Peter Morrill, Data Buoy's first director at the MTF, and a later director, James "Jim" Winchester, were pioneers in the development of the automated buoys, or "ocean platforms," that provided early

---

65. "Over 100 Fishing Boats Take Part In Skylab Space-Experiment," *The Pensacola (FL) News-Journal*, 6 August 1973; "Astronauts Salute Gulf Fishermen," *Mobile Press-Register*, 8 August 1973.

66. Gil Webre, "MTF's Role In The '70s: Space Technology," *The Times-Picayune*, 8 July 1973; "MTF Mission Assignments of Agencies In Residence, 1973," SSCHRC.

warning predictions for hurricanes, storms, and other adverse ocean weather. Dr. J.C. "Jerry" McCall, a former NASA and IBM executive and Vice Chancellor of the University of Mississippi, was named director of the first non-NASA agency at the SSC in 1977. Dr. McCall continues as director of the National Data Buoy Center.[67]

A strong thread of competence ran through the resident agencies during the 1970s. Many key personnel came to the MTF with NASA or with its contractors during the Apollo era and transferred their expertise to the onsite agencies. This relationship was a binding agent when the various agencies began working together and sharing scientific knowledge in joint endeavors.[68]

The synergism that Balch predicted came about with the multiagency arrangement. The combined knowledge gained was carried to all parts of the country. Indeed, knowledge gained by several agencies from their collective experiences in space and environmental matters at the MTF spread around the world. A Russian scientist and member of the USSR Academy of Sciences faculty, Yevgeniy Federof, brought his entire staff to the MTF to study the multiagency center in action. The Russians were especially interested in Jim Winchester's data buoy project, as were scientists around the world. They recognized that the project was more adept at measuring parameters "thousands of miles in space," than just a few feet beneath the ocean's surface.[69]

Obviously pleased by the attention his multiagency "brainchild" received, Balch described the consortium's work in glowing terms. "We have something here that many university research centers do not have," Balch bragged. "We provide accountable services to our agencies so that they can go about their business, doing their own thing, tending to their own projects without interference." No one involved with the multiagency concept at the MTF doubted Balch's sincere devotion to its success.[70]

---

67. *Ibid.*; MTF Director's Office Log, "Significant Events," 1971–1975, SSCHRC.

68. The success of such projects as the Skylab Oceanic Experiment, BOMEX, JSC-ERL satellite and airborne surveys in Louisiana, NOAA data buoy hurricane predictions, and successful projects conducted with the Mississippi State University and Louisiana State University attests to the competence of the engineers and scientists who have been involved in the work of the MTF-NSTL space-environmental complex.

69. NASA Administrator James Fletcher lauded the work of the consortium on 14 June 1974 when he announced the change in name and status of the MTF to the NSTL. See also "MTF Reports Of Its Death Grossly Exaggerated," *The Daily Herald*, 20 August 1972.

70. Jackson Balch, interview by Gateway Productions, 10 December 1974. Jackson Balch's management of the space-environmental complex comes very close to the classic study of American life in *Democracy In America*, by Alexis de Tocqueville. See the chapter of de Tocqueville's work entitled, "Why The Americans Are More Addicted to Practical Than To Theoretical Science."

Solid Rocket Sidepaths

Although the MTF seemed to enjoy a charmed life during the early 1970s, not all proposals for future growth came to fruition. One such unsuccessful venture was an attempt to manufacture and test the Space Shuttle's solid rocket motors at the MAF and the MTF. The proposal was initiated by a major aerospace company, a number of local business leaders, and the state of Mississippi. The Lockheed Propulsion Company of Redlands, California, was one of four companies entering bids on the project; specifying it would perform the work at the MAF and the MTF. To make their bid even more attractive, Lockheed proposed to use local subcontractors for 60 percent of the work. Other companies bidding for the solid rocket motor contract were Thiokol Chemical Corporation, Brigham City, Utah; Aerojet Solid Propulsion Company, Sacramento, California; and United Technology Center, Sunnyvale, California.[71]

Even with the MTF work population showing modest growth to 1,127 employees in October 1973, the workforce was far from its heady peaks of 6,000 employees during the Apollo era. When officials in the local communities heard of the solid rocket motor manufacture and test program, they pulled out all stops in an effort to support their political delegations and sway NASA to make a decision favoring the MTF. After all, the new solid rocket motor program would bring about 800 new jobs, divided equally between the MAF and the MTF. The program would mean a boost of over $400 million for the southwest Mississippi and southeast Louisiana economies.[72]

An impressive delegation of elected officials, business people, and community leaders from the Gulf Coast area organized a trip to Washington, D.C., in October 1973 to petition for "full utilization" of the MTF, Slidell Computer Complex, and the MAF. The group was careful not to publicly pressure NASA or their congressional delegations into "choosing Lockheed" for the solid rocket motor contract. Mississippi Governor William "Bill" Waller and State Senator Martin Smith led the Mississippi group, while U.S. Representative Lyndy Boggs and Senator Russell Long led the Louisiana group. Others in the delegation included long-time NASA-MTF supporters

71. "Officials Told Lockheed Proposal Will Be MTF Boom," *Picayune Item*, 14 October 1973.
72. "Officials Push Full Utilization," *Picayune Item*, 17 October 1973.

Leo Seal, Jr., and Roy Baxter, Jr. Senators Stennis and Eastland hosted the meeting in Eastland's office, with all five Mississippi representatives present. NASA Administrator James C. Fletcher and White House representatives were also in attendance. The contract was scheduled for awarding in November 1973.[73]

Even after the lobbying effort and a meeting in Eastland's office, Thiokol, not Lockheed, was awarded the solid rocket motor contract. Many members of the Gulf Coast community were instantly angered and urged Lockheed to protest the contract. After all, just a few years earlier NASA announced that the MTF was "the nation's foremost propulsion test site." Gulf Coast officials accused NASA of favoritism because Administrator Fletcher's home was in Utah. To add fuel to the fire, U.S. Senator Frank Moss, chairman of the Aeronautical and Space Sciences Committee, was also from Utah. Governor Waller led the angry verbal protest. State Senator Martin Smith, who worked hard in the lobbying effort before the contract was awarded, also issued strong public statements against NASA.[74]

The National Space Technology Laboratories

The reaction of the Mississippi-Louisiana congressional delegations was swift and angry, and, perhaps, helped set the stage for future favors for the MTF. The congressmen asked for a "full, detailed report on why NASA selected Thiokol Chemical Corporation for the solid rocket motor contract." The award was not overturned, but the calls for "full utilization" of the MTF by Stennis, Lott, and other political and community leaders kept the pressure on NASA to continue to keep the Gulf Coast complex on the front burner.[75]

On another front opened by Balch in his campaign to expand the "new MTF," State Senator Martin Smith became closely associated with the move at the State capital to see the MTF reach its full potential. Smith introduced a resolution in March 1974 asking the Mississippi congressional delegation to seek

73. *Ibid.*
74. "Smith Blasts Von Braun," *Picayune Item*, 24 March 1974.
75. "Thiokol Bid Explanation Urged," *South Mississippi Sun*, 30 November 1973; "GAO Space Pact Probe Urged," *The Times-Picayune*, 30 November 1973; "Job Given Utah Plant Opposed," *Times-Picayune*, 7 December 1973; "Politics, Cost Juggling Alleged In Space Shuttle," *The Clarion-Ledger*, 6 December 1973.

"fuller use" of the MTF. The decree requested that the name of the MTF be changed to the "Gulf Coast Space Technology Center," and that the MTF be "established as a separate and independent installation, reporting directly to NASA Headquarters." Quickly approved by both houses of the state legislature, the resolution was signed by Governor Waller and forwarded to Mississippi's congressional delegation. In Washington, it did help ignite the process that resulted in the MTF's name change and a new status for the installation.[76]

In Washington, Senator Stennis acted swiftly on the resolution from the Mississippi legislature. He told NASA Administrator Fletcher that he was disappointed the MTF had not reached "full utilization" and even questioned NASA's overall management ability because of "mishandling" of the MTF situation. Fletcher responded to Stennis's criticism by commissioning a trusted, former associate administrator for Organization and Management, Richard McCurdy, to go to the MTF for an in-depth management survey. The "McCurdy Report," generally complimentary of the Balch management, made two recommendations to Fletcher: (1) publicly assure NASA's commitment to the MTF's long-term future, and (2) change its management relationship, allowing better access to NASA Headquarters. The report did not recommend the site's independent status, which Balch felt was needed. Instead, McCurdy suggested that the management chain of command be connected to the Johnson Space Center (JSC) in Houston, Texas, rather than to the MSFC.[77]

Fletcher informed Stennis on 24 April 1974 that he proposed to take immediate action to assist the MTF. The NASA Administrator went one step further when he told Stennis he was appointing a former astronaut, Russell L. "Rusty" Schweickart, director of User Affairs in the Applications Office at NASA Headquarters, where he would be charged to work closely with the MTF to develop full utilization.[78]

Determined to get immediate action, Stennis did not wait for the bureaucratic process of assistance to take effect at the MTF. Even before hearing of Fletcher's intentions, Stennis on 19 April 1974, in a stern letter to the NASA

---

76. "Legislators Urge Use Of NASA Test Site," *The Sun-Herald*, 31 March 1974; NASA-MTF Public Affairs Office, "Newspapers Tell MTF Story," 1 March 1974, SSCHRC.

77. "Stennis To Investigate Use Of NASA Facility," *The Daily Herald*, 2 April 1974; John C. Stennis to James C. Fletcher, 19 April 1974; James C. Fletcher to John C. Stennis, 24 April 1974; William D. Carey, "Getting on with it: a management study of the MTF," 31 January 1974, SSCHRC; James McCurdy, "Management Survey of NASA Facilities in Mississippi and Louisiana," 22 April 1974, SSCHRC.

78. Stennis to Fletcher, 19 April 1974.

Administrator, said the "MTF should report directly to NASA Headquarters, as is the case with other NASA centers. For my part, I'll not be satisfied with less." The issue of "independence" from MSFC was apparently settled at this point. On 24 April, Fletcher proposed a meeting with Stennis to discuss "a more appropriate and descriptive designation for [the] MTF."[79]

With the long battle for a new and approved status for the MTF within the NASA family nearing an end, all that was left was the selection of an appropriate name. The name, the "National Space Technology Laboratories (NSTL)," was actually crafted in a joint effort between Balch and Stennis's staff members. Balch dreamed of the installation becoming "national" in scope. All parties concerned felt "space technology" must be used in the name because much of the work at the MTF was in the development and study of space technology. Finally, the new field installation was a "national laboratory," akin to the officially designated federal laboratories.[80]

On 14 June 1974, NASA announced the creation of the National Space Technology Laboratories (NSTL). Fletcher, obviously relieved to have the "MTF matter" finally over, said that the "NSTL has developed into an installation where highly qualified capabilities exist for conducting remote sensing, environmental, and related research through technology application. These capabilities have been enhanced in recent years by the location at [the] NSTL of research and technical activities of several other government agencies. The success of this expansion in relation to these mutually supporting activities has led me to decide that NSTL will have a permanent role in NASA's space applications."[81]

Senator Stennis predicted that "efforts to increase the use of [the] NSTL by NASA and other federal agencies [would] now be more successful than ever before." He also noted that the installation would become an equal partner with other NASA installations and report directly to NASA Headquarters. Stennis said, "I have long been convinced that it was a major obstacle to the facility's growth to work through the [MSFC] in Huntsville, Alabama." At the

---

79. *Ibid.*; Auter Collection, "The New MTF."

80. Auter Collection, "The New MTF"; See also Eli Ginzberg, James W. Kuhn, Jerome Schnee, and Boris Yavitz, *Economic Impact Of Large Federal Programs: The NASA Experience* (Salt Lake City: Olympus Publishing Co., 1976), pp. 27–47, 153–172.

81. NASA Headquarters Management Notice, 14 June 1974; NASA Headquarters News Release, 14 June 1974, SSCHRC.

end of the exciting day of the "NSTL" announcement, Balch lit up his pipe, smiled, and quietly mused to a handful of his associates that "it will be kind of nice to be a member of the club."[82]

The Navy Consolidation Move

The NSTL "opened" for business as an independent NASA field installation with a number of big items on its plate. Balch and his small NASA staff of 68 civil servants had to deal with all the administrative matters attached to becoming independent: chain of command channels, management relationships, legal, financial, personnel, public relations, and many other details. The role of "host agency" to the environmental family took on new meaning with new responsibilities. Activation of the Space Shuttle Test Complex was critical to NASA's space program. The Mississippi Army Ammunition Plant (MSAAP) was beginning to loom as a big ticket item for the Balch group to deal with. But no action was more consuming, or more important to the direction of the installation—which now numbered 1,370 people—than the coming of the Navy's oceanographic operations to the NSTL.[83]

The early seeds of the Navy move dated back to 17 June 1968, when three technical project people from the Naval Oceanographic Office visited the site. The visit was to evaluate the MTF's facilities and capabilities to handle large-scale scientific programming, as well as data analysis and reduction. The Navy was interested in using the Mississippi facilities for data reduction of information collected from numerous "points and sources." Many oceanographers became familiar with the MTF during the BOMEX project (1968 and 1969). Probably the most influential scientist was Dr. James Wakelin, Chairman of the President's Commission on Oceanography. Wakelin became a proponent of the MTF at the White House and in his associations with other Washington-based oceanographers. At the same time, then NASA Administrator James Webb had

82. "Stennis Announces MTF Reclassification," *(Bay St. Louis, MS) Sea Coast Echo*, 20 June 1974.

83. George Low to Jackson Balch, 14 June 1974; Conference Notes, George Low, Jackson Balch, Rusty Schweickart, others, "Creation of NSTL," 18 June 1974, NASA Historical Reference Collection (henceforth referred to as NHRC); Edgar C. Kilgore visit to NSTL, 27 June 1974; Jackson Balch, Edgar Kilgore, John Mathews, and Waldo Dearing Meeting Notes, "NASA Headquarters, Field Installations," 27 July 1974, NHRC; Acting U.S. Attorney General to George Low, "interest in use of NSTL," 16 July 1974, SSCHRC.

a sense that "oceanography," like space exploration in the early 1960s, would capture the interest of the scientific community. As a result, Webb instructed members of his Headquarters staff to assist in locating oceanographic programs at the MTF. Captain Robert Freitag of NASA Headquarters worked with Van King in early efforts to attract oceanographic programs.[84]

On an early "exploratory mission," Balch learned that Rear Admiral J. Edward Snyder, Jr., Oceanographer of the Navy, was looking for a suitable location to consolidate the Navy's various oceanographic research and operations elements. By the early 1970s, these Navy elements were headquartered at Suitland, Maryland, and scattered about the Washington, D.C., area. As the second largest employer in the Washington area, with 38,000 employees, the Navy was looking for a place to relocate some of its people to comply with an overall decentralization move under way. When informed of the Navy's possible interest in relocating, Balch immediately became involved in attracting them to the growing MTF consortium.[85]

Balch was not interested in bringing the Navy's entire oceanographic program to Mississippi. The research group, later known as the Naval Ocean Research and Development Activity (NORDA), numbered approximately 400 highly trained and educated researchers. Balch hoped to lure about 80 "Navy headquarters and managers" personnel to his facility. He felt that approximately 800 members of the Naval Oceanographic Office, which was the operations element of the oceanographic program, could be housed at the MAF in nearby New Orleans. The Louisiana congressional delegation, especially Senator Long, chairman of the Senate Finance Committee; and Representative Herbert, chairman of the House Armed Services Committee, were highly supportive of the idea. Stennis was informed of these developments and elated to learn of the Navy's interest in relocating to Mississippi. Such a move could help in reaching the goal of "full utilization." At that time, Stennis was chairman of the powerful Senate Armed Services Committee and known to have the ability to "make things happen" in Washington.[86]

---

84. Roy L. Bullock, "MTF Utilization Data," executive study, attachment 2, tab B, 1968; King, interview.
85. Admiral J. Edward Snyder, Jr., interview by Texas A&M University, "Living History Series," circa 1977–78, pp. 64–65; Mike Causey, "Senators Split On Navy Shift," the Federal Diary, *Washington (DC) Post*, 8 April 1975.
86. Jackson M. Balch, *Memorandum for the Record*, 26 September 1975; "Ocean Lab May Come To Gulf Coast," *Daily Herald*, 14 November 1974.

Stennis stuck to his policy of helping to bring those programs to Mississippi that were in the "best interest of the country." He stated that he would not exert any influence on the Navy move until the action was approved and cleared through the Navy and the DoD. Admiral Snyder concurred with Stennis's policy, and stated, "There was no political pressure. Senator Stennis didn't even know we had chosen it [the NSTL] until we told him." On the other hand, one of Snyder's point people for the relocation, Captain James Ayers, Commander of the Naval Oceanographic Office, said "considerable" congressional pressure existed for moving his agency's operation to the NSTL and the MAF. "Senator Stennis should get credit for lighting the fire," Ayers noted. Navy Secretary J. William Middendorf, II, said he would not make a decision on the move "based on politics"; instead, he wanted to study the financial aspects of the move.[87]

Snyder quietly told associates that the NSTL was by far the best possible place in the country to relocate the oceanographic offices. "I could not in my wildest dreams find a place like [the] NSTL," he said. "The site is absolutely perfect." Snyder was especially pleased with the 125,442-acre acoustic-buffer zone that would form a protective barrier for oceanographic programs critical to national defense. "Without the buffer zone," Snyder said, "we would not be interested."[88]

Admiral Snyder and Johnnie Stephens, an assistant, visited the NSTL 21–22 May 1974 for a two-day planning session with Balch. At that time, the strategy was for the Navy to locate research and development personnel at the NSTL and operations employees at the MAF. Balch favored this plan, which obviously met with the approval of Senators Long and Hebert of Louisiana, as well as Senator Stennis and Representative Lott of Mississippi.[89]

The first "official" announcement that the move was being considered was on 14 November 1974, when Lieutenant Commander Sandra Snodderly, Navy public affairs officer, said "a possible move of the office has been under study for five years." She noted that several sites were under consideration and that a decision would not be made until early 1975. Captain Ayres confirmed that the Navy was considering a move of its oceanographic elements

---

87. Snyder, interview by Texas A&M; "Nothing Official On Navy Agency," *Picayune Item*, 17 November 1974.
88. George Schloegel, interview by Mack Herring, Gulfport, MS, 2 February 1996.
89. NSTL Briefing Book, "Significant Actions;" King, interview; Jackson Balch, interview by Gateway Productions, circa 1974, audio tape in SSCHRC.

to the NSTL and the MAF. Although hopes were high in the Gulf Coast communities and in New Orleans, a long and tedious battle erupted between the Mississippi-Louisiana and Maryland political and community factions. The Navy relocation battle finally wound up with two cases in federal court, a General Accounting Office investigation, and congressional hearings. In fact, the federal court cases were still not settled until long after the Navy relocated in the summer of 1975.[90]

The Gulf Coast communities played an important role by helping acquaint Washington decision makers and the 1,200 Navy oceanographic employees with the positive aspects of the area. Stennis, knowing how important community support was to any enterprise, privately asked George Schloegel, vice-president in charge of marketing for Hancock Bank, to assist the Navy in making its move. Schloegel made many contributions to the Gulf Coast through the Jaycees and other community-oriented organizations. At that time, Schloegel was president of the Gulfport School Board. He had worked closely with his boss, Leo Seal, Jr., as a strong advocate of the NSTL and other programs promoting progress on the Gulf Coast. Admiral Snyder, who was convinced that the NSTL was the best place in the country to consolidate the Navy's oceanographic program, met with Schloegel and worked closely with him and other Gulf Coast leaders for over a year during the relocation period. During the early months of planning, the Slidell Chamber of Commerce also worked hard to help bring about the Navy relocation.[91]

A Shuttle Engine Ignites

The Navy move almost overshadowed an important milestone at the NSTL. The first ignition test of an SSME occurred without fanfare. Just three days after Jackson Balch announced he was retiring on 24 June 1975, the new Rocketdyne test team counted the system down and ignited the engine. Although the test lasted no more than one second and was described as just a "sneeze," the short firing signalled a return to propulsion testing after four years and seven months. The reactivated Space Shuttle Test Complex was now ready

---

90. Maria Watson, "Oceanographic Office May Locate At NSTL," *Daily Herald*, 14 November 1974.
91. Schloegel, interview.

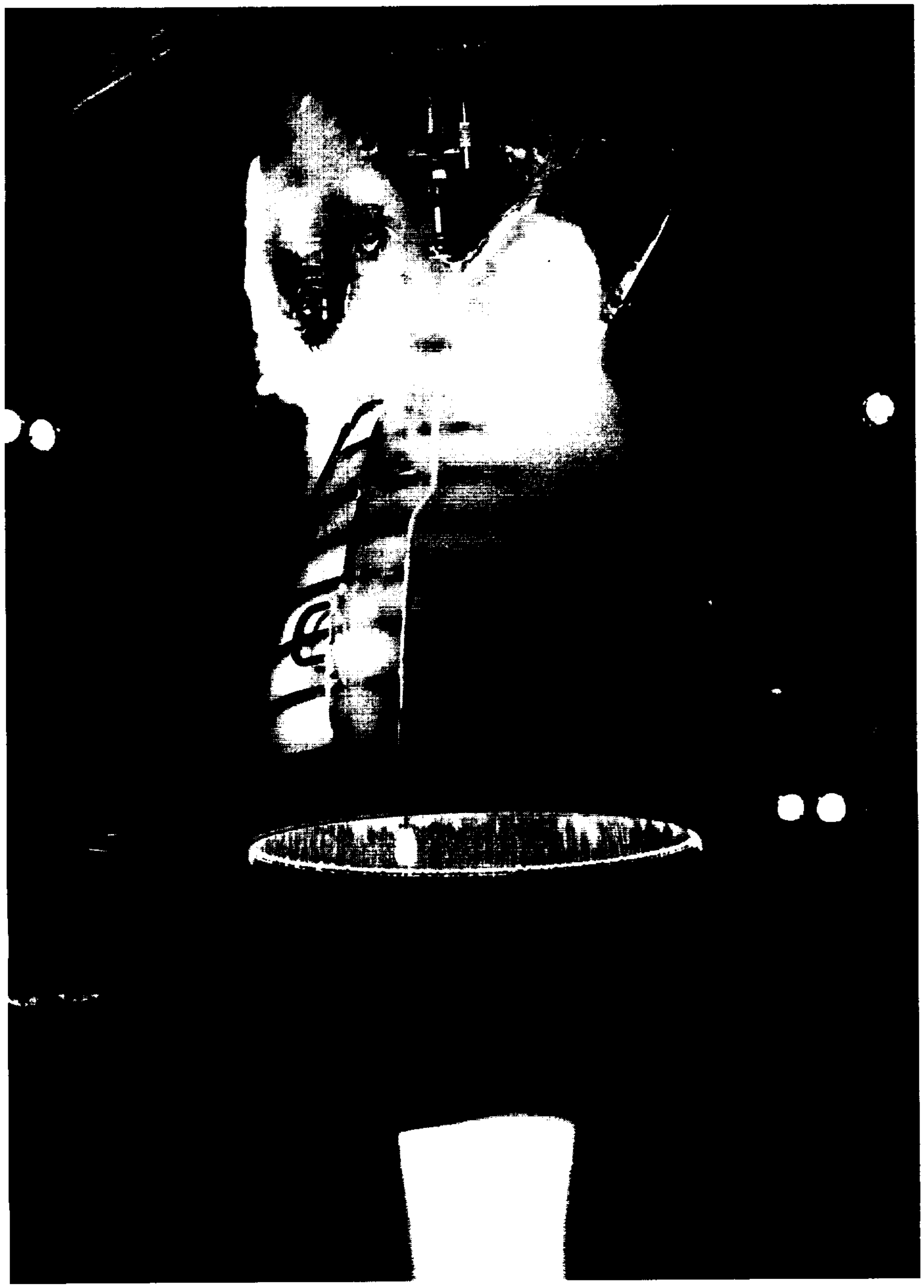
to begin the long and difficult task of testing the 470,000-pound-thrust SSMEs as part of their development for use on the new reusable space vehicle.[92]

The first test, commonly referred to as a "hot test," was conducted by the Rocketdyne Division of Rockwell International Corporation, under the auspices of Bob Bush's NASA-MSFC resident office at the NSTL. In addition to Bush, Boyce Mix, Ted LaMunyon, and Bill Spradlin made up the NASA "official" crew. Doug Howard and Jim Taylor were detailed to the onsite MSFC office from the Balch organization. The NASA-MSFC onsite team was joined later by David "Dave" Martin and Dianne Ezell. Rocketdyne had sent 24 experienced test engineers in December 1974 from the West Coast to augment its test team. Paul N. Fuller, a veteran rocket test manager, headed the capable Rocketdyne team as Resident Manager. Fuller began his career in rocket testing with the Redstone rocket program in 1953. Rocketdyne also shored up its experienced personnel by transferring Roscoe Nicholson, member of the Apollo/Soyuz launch vehicle team, from the KSC back to Mississippi. As head of Test Operations, Nicholson called on several of his former Saturn V colleagues. One of the "key guys" answering Nicholson's call was Leland "Lee" English, an experienced test engineer who became a stalwart for Rocketdyne.[93]

Engineers gained confidence for the "hot test" earlier in the month with a successful "fuel blow-down" on 3 June. In that test, the countdown marked one of a series of preliminary tests for the SSME prior to a main-stage testing planned later in the summer of 1975. The blow-down test involved a checking of the large, liquid-hydrogen engine's pumps and other components using the engine's actual propellants. The test was preceded by another liquid test using liquid nitrogen. A Countdown Demonstration Test (CDT), an important readiness check where crews complete all objectives except ignition, was accomplished before the first hot-test was done. The SSME test program went on from humble beginning in 1975 to become one of the premier rocket test

92. NASA-SSC Test and Engineering Directorate, "A-1 Test History," 22 December 1994, p. 1; SSC History Office, History Outline, "Chronology," October 1991; "First Shuttle Engine Test Series Completed," *The Times-Picayune*, 25 June 1995.

93. "Engineers Arrive To Activate Test Facilities," *The Daily Herald*, 19 December 1974; Jackson M. Balch and W.R. Lucas, "MSFC/NSTL Memorandum of Agreement For Space Shuttle Program," 20 February 1975; Steven Isakowitz, *Space Shuttle Launch Systems*, p. 253; Roscoe Nicholson, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 404, 1992, pp. 16–18, SSCHRC; Mix, interview.



A remote camera captures a close-up view of a Space Shuttle Main Engine during a static test-firing at the John C. Stennis Space Center. (SSC-81-201-1)

programs in history. Hundreds of rocket tests were conducted, breaking every record previously set in the propulsion business. In fact, the work of the SSME test crews was largely responsible for the center becoming known later as NASA's "center of excellence" for propulsion testing.[94]

Balch Era Ends

Jackson Balch ended his decade of leadership on 31 July 1975 during a period of action and change similar to the supercharged days of activation when he arrived in May 1965. The SSME program had begun, bringing the NSTL back into the rocket-testing business. The space and environmental consortium also continued to grow with additional agencies, and plans for the giant munitions complex were nearly completed. But, even more noteworthy to the future history of the installation, Balch's idea to bring part of the Navy's oceanographic element to the NSTL swiftly blossomed into a governmental upheaval of enormous proportions, far greater than even the "impossible dreamer" (Balch) imagined.[95]

Balch saved the struggling MSFC stepchild during a near-death "moment of despair" in February 1970. When a weary Jackson Balch announced his retirement, the future of the space and environmental facility he had envisioned was ensured.[96]

When Balch and Admiral Snyder first met, they were of one accord on the "partial" Navy move to the Mississippi facility. But, when Snyder found that he had support for locating the entire oceanographic complex at the NSTL, he went for the whole deal. Balch feared the total naval contingency would "overpower" his multiagency space and environmental concept. "The military and the others [civilian agencies] don't mix," he said. Balch only wanted the research oceanographers to "share" in the consortium. Snyder, with much stronger political and governmental support, wanted complete consolidation of his oceanographic center. Balch contended, however, that the Navy move was not the reason for his retirement. For those who knew him personally, this

---

94. A-1 Test History, SSCHRC.
95. Maria Watson, "Balch Recalls Progress At Hancock Test Facility Site," *The Daily Herald*, 24 July 1975.
96. Edmund R. Gray and Herbert G. Hicks, "The Mississippi Test Facility: A Study In Organizational Viability"(Baton Rouge, LA: Louisiana State University, May 1971).

dedicated man had, in reality, given his all—spiritually, mentally, and physically—to the premise of "full utilization" for the NASA site in Mississippi.[97]

97. "Balch Leaving NASA; Auter Assumes Post." *The Daily Herald*, 21 July 1975.

CHAPTER 10

In Search of a Role

Auter Takes Charge

When Jackson Balch stepped down on 31 July 1975, the leadership of the new National Space Technology Laboratories (NSTL) was passed to Henry F. Auter, a true rocket pioneer of the Mississippi project since its inception in 1961. A dedicated, hard-working engineer from Vicksburg, Mississippi, Auter was a favorite of von Braun, Heimburg, and Fortune. Even the maverick Balch depended on this quiet "man behind the scenes" to master details and help shape the NSTL into a practical, working laboratory. From the beginning, Auter was faced with the difficult task of holding the fragile NSTL framework together, as powerful forces from Washington threatened to collapse it.[1]

In fact, at one point NASA Headquarters seemed ready to "walk away" from the hard-wrought consortium, leaving the entire site to the arriving United States Navy oceanographers, except for the "fenced-in" portion that the Marshall Space Flight Center (MSFC) engineers were using to static test

---

1. "Balch Leaving NASA: Auter Assumes Post," *The (Biloxi/Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 21 July 1975; Ted O'Boyle, "Auter Named Acting Chief at NASA-NSTL," *The Daily Herald*, 22 July 1975.

the Space Shuttle Main Engines (SSMEs). After all, the doctrine of "full utilization" was almost realized with the addition of the U.S. Army plant for the manufacture of new and improved ammunition. With the Army and Navy moving onsite and the shuttle safely assigned to the MSFC, NASA felt less responsibility for the giant propulsion center's future.[2]

Auter gave almost two decades of his personal and professional life to advancing the Mississippi operation from its early planning years in Huntsville through its evolution to a space and environmental complex. For over a year, Auter served during a time of upheaval as acting manager, trying his best to continue flying the symbolic NASA flag.[3]

As the Navy move to the site accelerated and the Army ammunition plant began to materialize, NASA sent Jerry Hlass from its Washington headquarters to size up the chaotic NSTL situation and to determine whether the site was worth saving. True, the Space Shuttle Test Complex was secure in MSFC's hands, but the rest of the NASA-NSTL was indeed in danger of dissection. Hlass was faced with making a decision to dismantle the years of hard work by his friends and colleagues in NASA who had labored to fashion the new laboratory in south Mississippi.[4]

Acting Manager Auter was recognized as a "no nonsense" conservative engineer. Von Braun, Heimburg, and a multitude of professional followers knew Auter as a meticulous planner. This attention to detail was foremost in Heimburg's thinking when he first placed Auter in a leadership position with the MTF Working Group in the early 1960s and later recommended him as deputy of the early Mississippi Test Operations (MTO). Even before the Apollo program, von Braun and Heimburg relied on Auter to head the Electrical Systems Engineering Branch in the MSFC Test Laboratory. In that capacity, Auter was instrumental in the test and launch of the Jupiter-C rocket

---

2. Jerry Hlass, interview by Mack Herring, Long Beach, MS, 12 February 1996 and 15 February 1996; Henry Auter, "Management Review," 27 August 1976, p. 18, Auter Collection, Stennis Space Center Historical Records Collection (henceforth referred to as the SSCHRC).

3. NASA-MTF Biography, Henry F. Auter, September 1965, SSCHRC; Biography, Henry F. Auter, 1990, SSCHRC; Hlass, interview, 15 February 1996.

4. NASA Personnel Notice, Headquarters, 18 August 1976; "Hlass to Become Manager of NSTL Effective 1 September," *The (Biloxi-Gulfport, MS) South Mississippi Sun*. Jackson Balch told reporter Maria Watson in an interview for *The Daily Herald*, 24 July 1975, that a decision on the Navy consolidation would be forthcoming "in about a week." The retiring manager said he feared the Navy would "overwhelm" the smaller environmental agencies and that he "hadn't realized the insensitivity of the Navy." He suggested "the powers that be" directing NASA, the Navy, and the Army sit down and plan three separate installations.

that boosted the nation's first satellite, Explorer I, into orbit. Auter also participated in the test and launch of the Mercury- Redstone rocket that propelled Alan Shepard, America's first astronaut, into space. Auter was chosen by Heimburg to develop the activation plan for the Mississippi site before any construction began. He served as technical director for testing the Saturn V booster stages and helped Balch mastermind the plan for transforming the MTF into a multiagency space and environmental research laboratory. In fact, Auter made critical decisions about which facilities to build with the controversial $10 million set-aside funds.[5]



Henry F. Auter, deputy manager of the Mississippi Test Facility/National Space Technology Laboratories from 1963 until 1980, made many contributions to the installation as a manager, planner, and engineer. He was in charge of the testing of the Saturn V first and second stages and served as acting manager from 1975 until 1976. (SSC Portrait File)

Although Auter was known for his practical engineering achievements, he was an idealist at heart. His father was a riverboat captain on the Mississippi River, and the young Auter's voyages at his father's side on the river from his Vicksburg, Mississippi, hometown stimulated a spirit of exploration and adventure. In fact, while working at Cape Canaveral, Florida, as an Air Force engineer, Auter was fascinated by a Wernher von Braun article in *Collier's* magazine dated 22 March 1952. The famous article, about giant rockets, space stations, and voyages to the Moon and the planets, ignited Auter's interest and imagination, and he became involved in space exploration. Auter

5. NASA-NSTL, Auter Biography, 1975; Henry F. Auter, interview by Mack Herring, SSC History Office, December 1990; Eric Bergaust, *Werhner von Braun* (Bridghampton, NY: Vail-Ballou, 1976) pp. 276–277. Henry F. Auter was well-qualified to assume the acting manager's position. A recipient of NASA's Exceptional Service Medal and Special Achievement Award, Auter had proven his loyalty to NASA.

found a position at the MSFC Test Division, becoming a member of the von Braun team in 1953.[6]

Even with his optimism and wealth of expertise on the NSTL's development and operation, Auter was not prepared to battle the unseen forces bearing down on the new installation. The Navy was in the midst of transferring its oceanographic operations from the Suitland, Maryland, and Washington, D.C., areas; development of the Army munitions plant on 7,000 acres in the northeastern quadrant of the fee area was progressing; and the SSME test program was cranking up. In addition, several onsite environmental agencies were also demanding more attention from their NASA host; and Auter found the morale of his small civil service staff sinking to an all-time low.[7]

Auter had little time to settle into his NSTL Manager's chair before the Naval Oceanographic Office's arrival sent his plans awash. His first action, as prescribed by NASA on 1 August 1975, was to send a memorandum to a limited number of people announcing his position as acting manager of the NSTL. He appointed Waldo Dearing, who had served as an assistant to Balch, as acting deputy manager, and then invited all resident agency heads to a meeting on 4 August to "establish communications in the new relationship."[8]

Arriving, Naval Oceanographic Office

When Balch handed the reins of NSTL over to Auter, during a farewell press conference on 23 July 1975, the major decision on the Navy's move of its Oceanographic Office to the NSTL was "just days away." Secretary of

---

6. NASA-NSTL, Auter Biography, 1975; Henry F. Auter, interview by Mack Herring, SSC History Office, December 1990; Wernher von Braun, "Crossing the Last Frontier," *Collier's* (New York: *Collier's*), 22 March 1952, SSCHRC.

7. Maria Watson, "Navy Office Decision Expected Within One Week," *The Daily Herald*, 24 July 1975; NSTL History Highlights, "Shuttle Era," NS13-8-005. When Auter assumed the acting manager's post, the SSME test firings had just begun, the Army Ammunition Plant was finalizing plans for its complex, a move of the ERL to Slidell, LA, was in the making, and the resident agencies were "nervous" about the Navy coming. The population of the NSTL was 1,370, with an additional 1,200 Navy employees scheduled to arrive when all legal issues were resolved. Henry Auter, "Continuity Strategy," July 1975, SSCHRC.

8. Henry F. Auter, *Memorandum to Distribution*, "Assumption of Position, Acting Manager, NASA/NSTL," 1 August 1975; E.S. "Todd" Groo, NASA HQ Management Delegation, "Authority to Act for Manager, NSTL in the Event of an Attack on the United States and During Normal Conditions," 25 October 1974, NASA Historical Reference Collection, NASA Headquarters, Washington, DC (henceforth referred to as the NHRC).

Defense James Schlesinger was awaiting the conclusion of a study by the General Accounting Office (GAO) before making a final decision on the relocation. Representative Trent Lott pointed out that the GAO had found housing and schools in the Gulf Coast communities to be adequate.[9]

Auter became deeply involved in the massive Navy exodus even before he was officially designated acting manager. He went to NASA Headquarters on 31 July to meet with NASA's E.C. "Ed" Kilgore, deputy associate administrator for Center Operations, and Admiral Snyder to discuss the impending move. Several other NASA and Navy officials, including NASA's Waldo Dearing and the Naval Oceanographic Office's Captain James Ayers, were at the meeting.[10]

On 7 August, in an effort to get his organization ready to host its largest tenant to date, Auter appointed a "planning team" to coordinate the integration of the Naval Oceanographic Office. His objective was to provide for an orderly, efficient, and economical integration into the "family of cooperating agencies at NSTL." Auter named himself as team leader and selected as team members A.J. "Jack" Rogers, Jr., Facility and Equipment; A.M. "Mark" Payne, Cooperating Agency Interfaces and Supporting Services; D.L. "Dave" Johnson, Labor Relations and Determination; and Mack R. Herring, Public and Community Affairs and Protocol.[11]

Even though some of the new onsite agencies were small, they still demanded personal attention. The NSTL civil service employees, who wore several "hats," became adept at finding creative ways to work as engineers—contract monitors—administrative managers. The "can do" attitude known throughout the Agency grew during the many lean years at the NSTL.[12]

---

9. Maria Watson, "Navy Office Decision Expected," *The Daily Herald*, 24 July 1975.
10. Henry F. Auter, *Memorandum to Distribution*, "Planning for Coordination of Navy Oceanographic Move," 7 August 1975.
11. Henry F. Auter, *Memorandum*, 7 August 1975; See Director's Files, "Chronology of Significant Events," 31 July–27 August 1975.
12. Balch assigned or transferred personnel to other onsite agencies, e.g., ERL and the SSME Resident Office. No doubt he felt these employees might help future endeavors. He also felt he could recall them when he needed their services.

Washington Participation

With Auter preparing for the Navy move to Mississippi, NASA Headquarters turned its attention to matters at the national level to expedite the exodus. The GAO study, which essentially addressed problems raised by Representatives Marjorie Holt and Gladys Spellman and the rest of the Maryland delegation, was the last piece of information Secretary Schlesinger needed in order to make his decision on the move. The study found most of the delegation's fears unfounded. These concerns included the question of adequate square footage at the NSTL to accommodate the new personnel, affordable housing on the Mississippi Gulf Coast, and quality schools in the communities. The GAO promised a final report in November 1975, but that study was not expected to reveal any new findings. Knowing this, NASA announced on 12 August that Ed Kilgore, deputy associate administrator for Center Operations, would continue to be responsible for overall "policy and management oversight" pertaining to the NASA-Navy planning. Director Robert Curtin, Office of Facilities, was appointed to oversee issues and agreements affecting the Navy move.[13]

The NSTL facility issues were important because at least one agency had to be relocated to make room for the Navy. Bill Lilly, NASA Headquarters comptroller, was responsible for setting up appropriate charges to recover NASA's costs and for reporting the costs to the Senate Appropriations Committee. The Committee required an accounting of all funding associated with the move, since part of the Navy relocation decision was based on saving the federal government money.[14]

Admiral Snyder and members of his staff not only became involved with logistical matters at the NSTL, but with establishing good relationships with

---

13. E.S. "Todd" Groo to NASA Headquarters Distribution, "Responsibilities for NASA Activities Related to Navy Move to NSTL," 12 August 1975, NHRC. Action copies of this memorandum went to several officials at Headquarters, including Low, Shippey, Lilly, Kilgore, Curtin, and Madden. The memo placed Kilgore in charge of the Navy move at the Headquarters level and gave Henry Auter responsibility "on the ground" at the NSTL.

14. William "Bill" Lilly stated in a civil action suit affidavit [(75-1437, court of review unknown) Washington, DC (12 December 1975), that "Eighty-five persons associated with the Earth Resources Laboratory are to relocate to Slidell Computer Complex, thereby making space available at NSTL for responding number of Navy employees to relocate to NSTL." NASA planned to move the ERL back to the JSC, but decided instead to consolidate the AE and ERL at the Slidell Complex, and later to move both to the JSC. See also "Navy's Hearing Footsteps," *The Washington, DC, Evening Star* (henceforth referred to as *The Washington Evening Star*), 11 June 1975, and Fred W. Bowen, Jr., to Rear Admiral J. Edward Snyder, 24 July 1975, for explanation of NASA plans concerning charges to Navy at NSTL, NHRC.

the Gulf Coast communities. The energetic and charismatic Snyder made several visits to the NSTL to meet with Auter and his staff, and to call on community leaders to support his organization in Mississippi. Snyder quickly became a popular figure with Gulf Coast citizens, who had a long tradition of welcoming military personnel to their communities.[15]

Snyder was also in demand as a guest speaker at civic clubs and special events along the Gulf Coast. He addressed the annual Chamber of Commerce events in Picayune and Bay St. Louis; and he told the 50th Anniversary Hancock County Chamber gathering that the Mississippi Gulf Coast living conditions were "far superior" to those in the Washington, D.C., area. Snyder evoked some "ooh's and ah's" from the audience when he predicted the $223-million budget for oceanographic research was only "the tip of the iceberg."[16]

The Admiral was often accompanied on his trips by Flag Lieutenant Paul Gaffney, II. He made his home in Diamondhead, Mississippi, and became a frequent speaker at civic clubs and special community events along the Gulf Coast and in nearby New Orleans. Years later, Gaffney was promoted to the rank of Rear Admiral and placed in command of the Naval Oceanographic Office headquartered at the SSC, where he was respected by employees and colleagues alike as he promoted "multiagency" cooperation.[17]

NASA and Navy officials breathed a sigh of relief on 21 November 1975 when a memorandum of agreement was signed between NASA and the Department of the Navy "concerning Navy activities at the NSTL at Bay St. Louis, Mississippi." When the long-awaited GAO report was released 25 November, it cleared the way for the move. Included in the memorandum of agreement was an allocation of 179,200 square feet of floor space; a discussion of recoverable costs; a schedule of occupancy; details about the use of a Univac 1108 computer; and terms detailing alterations and construction of real property. The agreement stated that the Navy would become a principal

---

15. For account of Admiral Snyder's Gulf Coast activities see Director's Office files, "Significant Actions," 1975. George Schloegel, of Hancock Bank, told the author, 21 February 1996, that Admiral Snyder was a most impressive man, dedicated to his country and the Navy.
16. Maria Watson, "Navy Undersecretary Lauds [Naval Oceanographic Office] Bay Shift," *The Daily Herald*, 13 November 1975.
17. Biography, Rear Admiral Paul G. Gaffney, II, USN, "Commander, Naval Oceanography Command," SSCHRC. Roy Estess, named director of the SSC in 1989, remembers Gaffney traveling to the NSTL with Snyder. Estess said he and Gaffney often spent time talking while waiting for their bosses to discuss business, and later found it ironic that they themselves became directors of their respective organizations.

tenant "on or before" 1 July 1976. Most importantly, the agreement, signed in Washington, signaled that the NSTL was well on its way to obtaining "full utilization."[18]

A Tale Of Two Cities

Although most legal obstacles to the Navy migration to Mississippi were settled, or near resolution, opposition to the move by Naval Oceanographic Office personnel persisted. Admiral Snyder and Senator Stennis did not take employee resistance to the move lightly. The morale of the scientists, technicians, and military personnel was crucial to the success of the Navy's mission. The politicians did not want to bring the oceanographers to the Mississippi Gulf Coast "kicking and screaming." In Stennis's case, the judicious and compassionate Senator wanted to do "the right thing" for the new residents coming to his state. For this reason, Stennis asked George Schloegel of Hancock Bank to organize the Gulf Coast community and help promote the attributes of living and working on the Gulf Coast. U.S. Representative Trent Lott pointed out that the Maryland employees were stirred up by Representatives Marjorie Holt and Gladys Spellman, who did not want to lose their constituents with their $25-million payroll to Mississippi. The representatives' chief criticisms focused on inadequate schools and lack of affordable housing.[19]

In fact, some in Washington predicted there would be a "reversal of the blatantly political transfer of the Navy's Oceanographic Office." Noting that a number of oceanographers were refusing to pack for the move, rumors circulated that Defense Secretary James Schlesinger would decide the issue just "wasn't worth the grief." As one Washington, D.C., paper noted: "This is not just a matter of one jurisdiction losing a federal payroll. It is a matter of politics being played as usual in a day when the country can't afford such foolishness." In order to counteract the hostile atmosphere in Maryland and allay the concerns of the Naval Oceanographic Office employees, Snyder arranged for Schloegel to bring a delegation of Gulf Coast community lead-

---

18. NASA Management Instruction, "NASA-Navy Agreement—Navy Activities at NSTL," NASA NMI-193, 21 November 1975.

19. George Schloegel, interview by Mack Herring, Gulfport, MS, 21 February 1996; Maria Watson, "Navy Office Decision Expected Within Week," *The Daily Herald*, 24 July 1975.

ers and citizens to the Oceanographic Office in Maryland to speak to and meet with the Navy workers. An astute and persuasive young man, Schloegel was a leader in community endeavors on the Mississippi Gulf Coast since graduating from college. He was well-known and liked in the Gulf Coast communities, having worked with other leaders, such as Leo Seal, Jr., of the Hancock Bank, on civic and educational projects. [20]

Schloegel's good will mission was considered very important to the Navy's plans to relocate. After all, there had been few occasions in peacetime when an entire military element of some 1,200 people was moved at one time to a new location nearly halfway across the country. Schloegel called on educators, realtors, home builders, business people, recreation specialists, elected officials, and other civic leaders and asked them to travel with him 10–12 August 1975 to the oceanographic office. Their mission was to help allay the fears of the oceanographers and entice them to Mississippi. Snyder promised Schloegel an airplane to transport the community leaders to Maryland on 10 August 1975. Schloegel selected 30 people for the mission, representing a wide cross-section of Gulf Coast society. The group was called the "NSTL Oceanographic Task Force." The hand-picked community team, which also included representatives from Louisiana, gathered on the tarmac at the Mississippi Air National Guard hangar adjoining the public terminal at the Biloxi-Gulfport Regional Airport. The group became wary when they did not spot a suitable aircraft. Then, to their surprise, a presidential-type jet plane, identical to the famed Air Force One, appeared in the sky and began its approach. The excited Task Force travelers were flabbergasted, for they expected a plane similar to a DC-9, or even a military transport propeller plane. The Navy's use of such a fine airplane confirmed for Schloegel, once and for all, the importance of the Navy move.[21]

After the NSTL task force landed at Andrews Air Force Base, they were hosted during their stay by a prestigious group that included J. William Middendorf, II, Secretary of the Navy; H. Tyler Marcy, Assistant Secretary of the Navy; Admiral Snyder; and Captain Ayers. Also joining the Washington delegation and extending a welcome to the community leaders were Johnnie

---

20. Editorial, "Navy's Hearing..." *The Washington Evening Star*, 11 June 1975; Mike Causey, The Federal Diary, "Senators Split On Navy Shift," *The Washington (DC) Post*, 18 April 1975.

21. Schloegel, interview.

Stephens, special assistant to Snyder; Robert Ferneau, special assistant to Middendorf; Russ Greenbaum, public information officer; and Larry W. McCullen, Sr., president of the American Federation of Government Employees, Local 1028.[22]

While in Maryland, Schloegel's task force set up an information program at the Naval Research Laboratory (NRL) auditorium where Schloegel gave a straightforward, honest presentation—avoiding any "sales pitches." He and his community friends addressed practically all of the 1,300 employees of the Suitland facility. At a previous hearing in the Suitland area, the major concerns expressed were about Mississippi education and housing. The education concerns included fears about inadequate school capacity, poor quality of education, inferior school curriculums, and lack of libraries in the area. Housing concerns ranged from inadequate units to accommodate the potential influx, the number of apartments available, and price ranges. Other questions asked were related to employment opportunities for dependents, availability of day-care centers, and cultural opportunities.[23]

Another special line of questions involved racial segregation along the Gulf Coast. The concerns were stimulated by information the Navy employees heard, indicating at least one segregated movie theater existed; some doctors' offices contained separate waiting rooms for blacks and whites; segregated neighborhoods existed; and memberships in private recreational facilities were denied to blacks. Several black civic and business people were in the Mississippi group, and they answered these types of questions. For the most part, the problems brought up existed years earlier all over the South, including the Gulf Coast.[24]

In addition to the presentations in the NRL auditorium, the NSTL Task Force set up card tables in the lobby with specialists at each table covering topics of interest for the Navy workers. The Navy workers could also complete forms requesting further information about the Gulf Coast. In addition, all employees were given issues of the Biloxi-Gulfport daily newspaper to help

---

22. *Ibid.*

23. Private Papers in the possession of George Schloegel, Gulfport, MS. Schloegel's files on the community representative's visit to Suitland, Maryland, are an excellent record of what community planning, hard work, and spirit can accomplish. The files illustrate the thorough approach taken to inform and sell the Maryland Naval Oceanographic Office (NOO) personnel on the Gulf Coast.

24. Schloegel, interview.

them learn more about the Gulf Coast. Schloegel said the community effort was a success, noting a marked difference in the attitude of the Navy employees at the conclusion of the visit. Indeed, after settling into their new homes in Mississippi and Louisiana, the Navy employees became active citizens and leaders in their new communities. Most, who later retired from Navy employment, remained in the area. The relocation of the Naval Oceanographic Office to the Gulf Coast produced other results. Many lasting friendships developed between the "Task Force" community members and the incoming Navy civilian and military employees.[25]

Making Room For The Navy

Although it was generally known and discussed quietly within management circles, the fact that NASA had to move the ERL from the NSTL to make room for the incoming Naval Oceanographic Office was not publicly known until 15 August 1975. As early as 24 April, A.J. "Jack" Rogers, Jr., NSTL facility chief, knew "NASA is going to bite the bullet and inform Wayne Mooneyhan (ERL director) that he can tell his people it is possible that ERL will move to Houston." In fact, early NASA planning was to send the ERL back to Houston before adequate space was found at the Slidell Computer Complex for the 110 civil service and contractor people associated with the Lab. When word got out that a move of ERL to Houston was being considered, many employees wrote to Stennis and Lott protesting the westward migration to Houston. NASA determined that a closer ERL relocation would be less expensive and disruptive for the ERL scientists and technicians, since most personnel lived in Slidell, Picayune, or on the Gulf Coast. NASA officials also recognized that much of the ERL work was carried out in conjunction with other environmental agencies collocated at the NSTL. A move was necessary, however, because the first floor of Building 1100, occupied by the ERL, was the best space on the installation to accommodate the first wave of the Navy relocation. As a result, the Slidell Computer Complex, located only 15 miles away was the logical choice for a new ERL location.[26]

---

25. *Ibid.*
26. A.J. "Jack" Rogers, Jr., Daily Journal Record Book, 24 April 1975.

Indeed, the ERL move and an associated attempt to consolidate and move the NASA Applications Engineering (AE) group became a cause celebre for many protesting NSTL employees and their community friends. The first public announcement came 15 August when Maria Watson broke a story in *The (Biloxi/Gulfport, MS) Daily Herald* headlined, "Lab Plans Relocation of Hancock Personnel." The announcement of the ERL move was one of the dire predictions made by Balch when he retired. Since many thought the ERL's move would weaken other agencies and cause a "falling domino effect," public announcement of the move caused alarm among the employees.[27]

Although the Slidell move was considered "disruptive," the short commute was far better than moving some 400 miles to Houston. Organized in 1970 at the insistence of Senators Ellender and Stennis, the ERL gained national attention for its research and its applications of remote sensing and space technology. The unique laboratory was especially attuned to the user needs of "the man on the street." At the time of the proposed relocation, the ERL was in the middle of several three- or four-year programs in conjunction with state agencies in Mississippi and Louisiana. Mooneyhan had a very well-educated and experienced scientific team with 40 to 50 percent of the civil service personnel holding doctoral degrees. With such special credentials in a wide range of disciplines, NASA did not relish the idea of losing any of these specialists.[28]

As preparations progressed for the ERL relocation, E.S. "Todd" Groo, associate administrator for Center Management, met with Auter on 11 December 1975 to discuss the ERL move and the transfer of all "programmatic" responsibilities to ERL. Such a transfer would have left the NSTL with only institutional "housekeeping" chores. Groo told Auter on 19 December that all work not transferred to ERL "shall be terminated" and the associated personnel positions "eliminated," resulting in a reduction of the NSTL personnel by fiscal year 1976. When Groo made these decisions, the NSTL civil service complement was 70, with one position in reserve. Groo set 15 January 1976 as the date for a consolidation program to be reviewed and approved at the Headquarters and sternly warned Auter not to discuss any "shifting of

---

27. Maria Watson, "Lab Plans Relocation Of Hancock Personnel," *The Daily Herald*, 15 August 1975.
28. *Ibid.*

work or change in the NSTL mission," unless it was with Groo's office or the heads of the affected program offices at NASA Headquarters."[29]

Clearly the actions suggested by Groo would have eliminated any chances the small NSTL organization had of becoming a viable NASA space and environmental entity. After all, the AE was created largely for the purpose of giving NSTL a "program" office and a means of interacting with the several onsite environmental agencies, as well as with the States of Mississippi and Louisiana. Auter, who worked extremely hard to develop the NSTL space and environmental complex, strongly opposed the Groo directive. Sadly, in his position as acting manager, Auter could do no more than voice his opposition.[30]

Meanwhile, the morale of the NASA-NSTL employees began declining as they sensed the powerlessness of their acting manager to secure a mission in the face of the massive Navy influx. Indeed, the NSTL NASA staff began complaining at the Monday morning staff meetings and demanding answers from Auter on how to cope. Auter wanted to stabilize the organization, assign personnel to permanent positions, and develop a definitive mission statement.[31]

Groo, however, told Auter he could not proceed with this action until the AE consolidation with the ERL and after an "institutional" NASA organization, without program responsibility, was forged. Most NSTL employees approached the Christmas holidays in a state of frustration, not knowing if their jobs were secure at the unsettled site. Several NSTL employees even sent resumes to the Navy; others, however, vowed to fight for their jobs.[32]

With ERL making plans to relocate to the Slidell Computer Complex and the Navy measuring first-floor space of the NSTL NASA Administrative Building, 1976 rang in a bleak message for Auter and his struggling NSTL organization. With the activity of preparing for the ERL move and the AE consolidation, keeping Groo's grim secrets from the NSTL's weary crew was impossible.[33]

---

29. E.S. "Todd" Groo to Henry F. Auter, 19 December 1975.
30. *Ibid.*
31. *Ibid.*, The author can recall numerous meetings during which staff members would complain of inaction.
32. Jerry Hlass, interview by Mack Herring, 27 February 1996. Hlass related during 27 February interview that Henry Auter was deeply concerned about the morale of the NSTL civil service workforce.
33. Larry Ciko, "ERL Moving From NSTL To Slidell," *The Times-Picayune*, 24 January 1976; Maria Watson, "NASA Begins Relocation Of Earth Resources Laboratory," *The Daily Herald*, 20 January 1976; NASA-MSFC Facilities Document, "Description of Floor Space Available at NASA's Slidell Computer Complex," n.d., SSCHRC.

The first ERL personnel began their move to the Slidell Computer Complex the week of 19 January 1976. They were originally scheduled to begin relocating on 15 December 1975, but the space for the Lab personnel was not completed on time. Although the budget for the lab was $3.7 million, the 110 civil service and contractor personnel were not transferring all funds out of Mississippi across state lines into Louisiana. About 50 percent of the ERL personnel were residents of the Slidell area already. An estimated 30 percent lived in Picayune, and 20 percent lived along the Gulf Coast. Wayne Mooneyhan, ERL director, said the ERL Beech aircraft used in airborne remote sensing observations would remain at Stennis International Airport in Hancock County, because the Slidell Airport runways were too short. Mooneyhan said, on the other hand, that the ERL move was not being undertaken to make way for the Navy, but rather, to take better advantage of the NASA space available at the Slidell Complex.[34]

A Matter Of "Guts"

Even while moving vans were being loaded with office and laboratory equipment for the ERL relocation, news from New Orleans came in a surprise newspaper story, written by Larry Ciko in *The (New Orleans, LA) Times-Picayune*, that put a halt to the AE consolidation, perplexed Senator Stennis, and angered some NASA Headquarters managers. The headline in the popular morning newspaper in the area read, "NASA Will Move NSTL 'Guts' From Hancock to Slidell." The story, quoting an unnamed source, stated that NASA planned to consolidate the AE personnel and functions with the ERL and move them to Slidell, a move that would transfer "the guts of NSTL" from Hancock County to Slidell.[35]

Indeed, up until this point, NASA denied that the ERL move to Slidell was precipitated by the Navy's massive relocation to NSTL. The floor space agreed to by NASA and the Navy supposedly was enough to accommodate the Naval Oceanographic Office's needs. Balch and the Maryland congressional delegation contended the floor space allotted was not enough, indeed, the GAO even

34. Ciko, "ERL Moving..." *Times-Picayune*, 24 January 1976.

35. Larry Ciko, "NASA Will Move NSTL 'Guts' From Hancock to Slidell," *Times-Picayune*, 29 January 1976.

looked into the matter. A departure from the publicly stated policy at this point of the Navy relocation was more serious to those involved than the transfer of the NASA AE personnel and their function from the NSTL.[36]

The "unnamed source," Ciko referred to in his article, became a focus of much discussion. Some blamed Balch, long since retired; others blamed members of the AE office who did not want to be consolidated with the ERL. Nevertheless, the "guts" story started another rhubarb in the press that was not pleasing to NASA Headquarters and was most especially disconcerting to Senator Stennis, who finally wanted to see "full utilization," without further embarrassment in the communities where his puzzled constituents were patiently awaiting their new Navy neighbors. The huge Navy influx was expected to solve the Gulf Coast community problems, but, at the same time, south Mississippians did not want to lose the solid NASA citizens who stood with them through "thick and thin," and bonded with them during the terrors of Hurricane Camille.[37]

The impromptu announcement on 29 January 1976 in *The (New Orleans, LA) Times-Picayune* also came at a time when the Navy was preparing a revised, environmental impact statement to comply with a federal court order, which was holding up the big Navy move to Mississippi. Although only 10 civil servants were involved in the AE consolidation with ERL, their work was supported by 24 contractor personnel and the AE programs were the threads that attached the NSTL to the several onsite resident agencies and the states affected by their experiments and demonstration projects.[38]

The *Times-Picayune* story regarding the AE consolidation with ERL travelled far and fast; NASA's Groo found himself in Senator Stennis's office in Washington explaining the consolidation attempt to the Senator and William "Eph" Cresswell, Stennis's long-time administrative assistant. Stennis suggested to Groo that the timing of the consolidation move was "unfortunate" and he asked Groo to "reconsider" the decision and reverse it if possible. Stennis told Groo to "work the matter out with Mr. Cresswell," and he

---

36. Because of the heavy opposition to the Navy's move by the Maryland congressional delegation and the Suitland, Maryland, community, the amount of space available at the NSTL became a major issue. Opponents claimed adequate floor space did not exist at the NSTL and the congressional delegation requested the GAO to investigate the matter.

37. Larry Ciko, "Engineering Office and Lab Merger Plan Is Confirmed," *Times-Picayune*, 30 January 1976; NSTL Office of Applications Engineering, "Office of Applications Interim Management Plan," ud.

38. *Ibid.*; Watson, "NASA Begins...." *Daily Herald*.

(Stennis) would go along with whatever they decided. At a later date, Groo met with Cresswell, and James "Jim" Gehrig, staff member of the Senate Appropriations Committee, and Don Fitts, Senator Stennis's press secretary. Cresswell told Groo the decision to consolidate AE with ERL should be reversed, and the people involved should not be moved.[39]

Groo returned to Stennis's office the following week, on 5 February, and proposed that the consolidation might be delayed for "an indefinite period of time." Cresswell agreed to Groo's plan and promised he would take no further steps on the organizational change "without notifying [Groo]." With the Washington decisions regarding the ERL and AE consolidation move made, the implementation of the edict and answers to the media were referred to the NSTL staff. Waldo Dearing, deputy acting manager, referred several questions asked by reporter Ciko, to Washington and requested answers from them. On 12 February, Groo forwarded to Dearing, through Richard "Dick" Weinstein, the following answers in talking with Ciko and other media representatives: "(1) The NSTL is not now fully utilized, so with the Navy move currently in the balance, it was concluded inappropriate to move the AE functions, (2) The length of the delay will depend on the time the court takes to finally decide on the Navy injunction, (3) It continues to be a goal of NASA Headquarters to consolidate the AE programmatic functions with ERL, and (4) Obviously in light of the above answers, the Navy move is involved with the delay."[40]

NASA Headquarters managers decided to make the long-sought-after goal of "full utilization" the culprit in the consolidation of the ERL and AE organizations. A Response to Queries (RTQ) was developed on 6 February and made available to the press. The statement said, "Maximum utilization of the former Mississippi Test Facility was one of the underlying reasons for the formation of NSTL in 1974, and all decisions involving use of the site will continue to be weighed against that goal which remains unchanged. In the meantime, necessary mechanisms to assure effective programmatic coordination between the work of the ERL and the NSTL Applications Engineering group are being established."[41]

---

39. Memorandum, E.S. "Todd" Groo to Dr. James C. Fletcher and George Low, "NSTL," 20 February 1976, NHRC.

40. E.S. "Todd" Groo—Richard Weinstein to W.H. "Waldo" Dearing, 12 February 1976.

41. W.H. "Waldo" Dearing, *Memorandum for the Record*, "Inquiry by Mr. Ciko, *The (New Orleans, LA) Times-Picayune*, NSTL Organizational Changes," 12 February 1976; Richard Weinstein to W.H. Dearing, "Response to Queries," 12 February 1976.

After the brief, early winter hiatus on the ERL relocation, the matter was settled, and the laboratory completed its move to Slidell without the AE group. The ERL was a few miles closer to its Johnson Space Center (JSC) home base, but any thoughts of a move to Houston ended in a squabble, with Senator Stennis clearly showing his disapproval for such a final destination. The controversy focused more attention on the Navy relocation from Maryland to Mississippi and added credibility to the argument of the opposing Maryland delegation that there really was not enough room at the NSTL for the oceanographers. The handling of the matter caused the press to keep a wary eye on the movements of the Navy and NASA, which proved to be an aggravation for some of the managers charged with the massive Navy move.[42]

AE Continues Its Projects

With the relocation of ERL and the consolidation of AE put to rest, the AE group continued its efforts in several new areas to demonstrate Earth use of space technology. Most of these pioneering projects involved use of satellite systems to collect data for the user community, a concept promoted during the infant days of the MTF/NSTL during the late 1960s and early 1970s. Many of these projects attracted the attention of other federal and state agencies, national organizations, the medical community, and private industry. For instance, AE devised a system for the Corps of Engineers to monitor the Mississippi River for flood control and weather forecasting. A data collection effort was designed to aid the National Park Service in inventory and land use in recreation park areas in Delaware, Utah, and the Great Smoky Mountains.[43]

Another data collection system designed by AE demonstrated economic feasibility of the acquisition of continuous satellite data. These data were used for the measurement of subterranean hydrology and water quality by a number of federal and state agencies, including the United States Geological

42. PAO Correspondence File, Telephone Request from Mack Dryden, reporter, *The Sun-Herald*, 29 January 1976. Larry Ciko, Maria Watson, and another reporter asked penetrating questions concerning the Navy move, ERL relocation, and the AE consolidation. Dryden asked: (1) What are we not to believe about NSTL—will it be a host agency without a project function? and (2) How long can NASA last in a purely administrative capacity after the Navy moves in?; NASA-NSTL, "Statement on NSTL Organizational Changes," 6 February 1976.

43. Henry F. Auter, "Management Review: NSTL Office of Application Engineering," 27 August 1976, p. 6.

Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service, the states of Mississippi and Louisiana, and the Pearl River Basin Development District. Part of this work utilized data from the SEASAT satellite system.[44]

Perhaps the most visible of the satellite data collection projects, and one that attracted national media attention, was using satellites to collect and transmit medical data. The medical data project involved a number of federal, state, local, and private organizations. In this project, the AE team worked with the NASA Headquarters' Office of Technology Utilization, the Southern Regional Medical Consortium, the University of Southern Mississippi, the Mississippi Governor's Office of Science and Technology, the Southeast Air Ambulance Service District, and the General Electric Company. This diverse group succeeded in sending cardiac monitoring data from a speeding ambulance, helicopter, or ship to the emergency room of Forrest General Hospital in Hattiesburg, Mississippi. The experiment drew praise from national search and rescue associations, the medical community, and the news media.[45]

Another AE project that gained national and international notoriety was the use of vascular aquatic plants for pollution control, and as a source of energy in food products for humans and animals. In the early phases of the experiment, the water hyacinth plant was used to treat sewage on the NSTL installation. Later, the natural sewage treatment system was used by several local communities and in such places as San Diego, California, and Disney World's Epcot Center in Florida. The potential of treating a closed-ecological system in space showed merit and also attracted some attention at NASA Headquarters. The local and national news media publicized this project widely, largely because of its low cost and simplicity of use.[46]

Several other applications, data, and technology projects were under way at the AE office, conducted in conjunction with the NASA Office of Applications and the Technology Utilization Office. Most were funded by Research and Technology Operating Plans (RTOPs), the method by which most scientific and engineering projects outside the Office of Space Flight

---

44. *Ibid.*, pp. 7–8.
45. *Ibid.*, p. 9.
46. *Ibid.*, p. 13.

were funded. When George Constan, former manager of the Michoud Assembly Facility, joined Balch as assistant MTF manager, he taught the AE staff how to write RTOPs to obtain funding from NASA Headquarters.[47]

The AE personnel included mostly former rocket test engineers. In the application of space technology, their individual talents and personalities were essential. In addition to their personal efforts in "retraining," Balch had even attached several AE engineers to the ERL on a "one-on-one" basis with the Lab's scientists to learn more about environmental science.[48]

Henry Auter was the chief of the office but ceded its operations to "teams." Roy Estess headed the Technology Transfer and Utilization Team comprised of John Ivey, K.R. "Ken" Daughtrey, and D.G. "Dewey" Little. W.L. "Larry" Hopkins led the Technology Applications Team, which included R.B. "Bobby" Hegwood, B.G. "Bobby" Junkin, and Lelyn "Lee" Nybo. William C. "Billy" Wolverton was chief of the Environmental Systems Development Team, including members Rebecca "Becky" McDonald, W.D. "Bill" Montgomery, and Robert "Bob" Barlow. All these people, with the exception of Wolverton, McDonald, Barlow, and acoustics expert Nybo, were former rocket test engineers and came to NSTL during the Apollo era.[49]

The teams included the "converted" scientist-engineer cadre developed when the installation began to diversify and take on the space-environmental flavor in the late 1960s and early 1970s. In fact, several of these engineers comprised the "marketing department" that sought out other agencies and businesses during the early years of the drive toward "full utilization." In essence, they went out and discovered, recruited, and helped establish onsite the very agencies they later worked with for their space applications and technology utilization projects.[50]

---

47. *Ibid.*
48. *Ibid.*; Ken Daughtrey, interview by Mack Herring, Seminary, MS, 2 March 1996. Ken Daughtrey explained the work and status of the AE in the winter months of 1976, during the consolidation controversy. Daughtrey, along with Roy Estess and John Ivey, was one of the "engineer-scientists" whom Balch referred to as the "three marketeers." Others participated in marketing the MTF/NSTL, but these men were the ones Balch used as his "point" personnel.
49. NASA-NSTL, "Briefing Book, Office of Applications Engineering," 1975. This document describes the AE group during its heyday in 1975–1976.
50. Daughtrey, interview.

Navy Piped Aboard

After a long and arduous bureaucratic and political battle of at least three years, the Naval Oceanographic Program was symbolically established at NSTL in a colorful ceremony. However, before the flag-raising ceremony, on 28 May 1976, Admiral Snyder and Henry Auter worked out many details to make sure the event was in keeping with terms agreed to by the two agencies.[51]

Admiral Snyder stressed the importance of upholding NASA's role as host agency and requested that NASA coordinate public affairs activities connected with the event. As a result, media and logistical details were arranged between Eph Cresswell and Mack Herring (NASA PAO). Snyder's request seemed somewhat strange at the time, but the arrangement helped establish NASA's role as host agency and tended to lessen the image that the Navy was "taking over," overpowering NASA and other government agencies.[52]

In early May, Snyder's aide, Flag Lieutenant Paul Gaffney, II, contacted Auter to begin working out details of the flag-raising ceremony. They decided to stage the event in front of Building 1100, site of the American flag and the flags of NASA and several resident government agencies.[53]

The well-planned Navy flag-raising ceremony did not come off without a few last-minute concerns. On 23 April, there was news that the Department of the Interior's Earth Resources Observation Systems (EROS) office was relocating to make way for the Navy arrival at NSTL. James Halsey, USGS assistant program director, said the reports had "no substance," but later confirmed that discussions were held at the "highest level" to explore such plans. A story by Maria Watson in *The Daily Herald* quoted sources at the NSTL as being concerned over the possible loss of the EROS office. The EROS affair blew over, but there was still more activity in the wind before the Navy flag would fly over the NSTL.[54]

On 27 May, the day before the ceremony, Johnnie Stephens called a press conference to clarify a misunderstanding concerning the invitees to the cere-

---

51. J. Edward Snyder, Jr., to Henry F. Auter, 10 May 1976; J. Edward Snyder, Jr., Memorandum for Commanding Officer, Naval Ocean Research and Development Activity, "Flag Raising Ceremony Public Affairs Coordination," 17 May 1976.
52. *Ibid.*
53. J. Edward Snyder, Jr., to Henry F. Auter, 10 May 1976.
54. Maria Watson, "Research Center May Be Moved From Hancock County," *The Daily Herald*, April 23 1976. The USGS EROS office worked closely with NASA and several NSTL environmental agencies onsite. Gary

mony. Stephens said the special invitations being sent out were intended for those with reserved seating, and that the public was also invited. Apparently, word got out in the local area that only those with invitations could attend. The Navy and Senator Stennis, of course, wanted as many Gulf Coast residents as possible to attend.[55]

While Stephens was getting the details of the ceremony straight with the local press, some embarrassing questions were posed. Maria Watson of *The Daily Herald* asked if the Naval Oceanographic Office transfer to Hancock County was a "trade-off" between Admiral Snyder and Senator Stennis. Watson was referring to legislation pending in Washington that would allow Admiral Snyder, retired, to be recalled to active duty as the Navy Oceanographer. Stephens quickly replied, "to my knowledge, Senator Stennis has never met Admiral Snyder." Stephens continued to answer some difficult questions from the media. One reporter asked if the Navy planned to take over the site, and Stephens replied that the Navy had no intention "at [that] time" of taking over the NSTL site. However, Stephens did say "as to what happens down the pike, I can't answer that." He told reporters that 1,200–1,300 Navy personnel would be employed at the NSTL, with about 65 percent of the Navy's current oceanographic employees in the Washington, D.C., area making the transfer.[56]

On 28 May 1976, the gala flag-raising ceremony was held on schedule, an event long remembered by the estimated 2,000 NSTL employees, dignitaries, and general public who attended. But, of all of the people gathered at the permanent flagpoles in front of Building 1100, Senator John Stennis was most likely the proudest person.[57]

The nationally recognized statesman and American patriot was a staunch supporter of a strong national defense. As chairman of the Armed Services Committee, Stennis was especially fond of the Navy and later became known as the "Father of America's Modern Navy," because of his special funding sup-

North, a close friend of Jackson Balch, was an early participant in the space-environmental complex. Reporter Maria Watson covered the Navy relocation story from its very inception and NASA-NSTL employees felt comfortable talking with her. This story was carried across the top of page one, making it very visible for members of the congressional delegation. News of the possibility of EROS leaving the site was exactly what Senators Stennis and Lott did not want to read just before a big Navy welcoming ceremony.

55. Maria Watson, "Navy Official Denies Senate Action Against Stennis 'Trade-Off'," *The Daily Herald*, 27 May 1976.

56. *Ibid.*

57. NASA-NSTL Weekly Bulletin, Bay St. Louis, MS, no. 37, 4 June 1976, SSCHRC.



Navy "side boys" give U.S. Sen. John C. Stennis an official welcome during the Navy flag-raising ceremony at the National Space Technology Laboratories on 28 May 1976. (SSC-76-111-6)

port in Congress. He was recognized with the Freedom Medal award as a token for his work to establish a strong military and as a leader in the Cold War against the Soviets. To be able to welcome such an important and prestigious organization as the Navy's oceanographic activity to his home state was of special significance to Stennis. The proud Senator even predicted, years earlier in his famous Logtown speech on All Saints Day in 1961, that the NASA site would someday have an important role in national defense.[58]

Other notables sharing the dais with Stennis included Secretary of the Navy J. William Middendorf; U.S. Representatives Trent Lott and G.V. "Sonny" Montgomery; Rear Admiral J. Edward Snyder, special assistant to the Under Secretary of the Navy; Julian T. Burke, commandant, Sixth Naval District; Captain Charles G. Darrell, commanding officer, Naval Ocean Research and Development Activity (NORDA); Captain James E. Ayers, commanding officer, Naval Oceanographic Office; Captain C.R. Ward, director, Naval

58. Office of John C. Stennis, "John C. Stennis Biography," ud., SSCHRC; Commissioning Brochure, John C. Stennis CVN-74, SSCHRC; Mack R. Herring, "John C. Stennis, Father of America's Modern Navy," *Lagniappe*, 9 December 1995.

Oceanography and Meteorology; Herbert G. Rowe, associate administrator, NASA; and Henry Auter, acting manager of the NSTL and host.[59]

The ceremony was replete with Navy customs and protocol. The dignitaries walked briskly to the ceremonial platform between two rows of "side-boys" in keeping with the old naval custom of "piping the side" when high-ranking visitors came aboard a ship. At the same time, a Boatswain's Mate blew his shrill pipe as a ship's bell rang out, signaling the dignitaries arrival. A 25-piece Navy band offered the special ruffles and flourishes that render honors.[60]

Members of the Gulf Coast community swelled with pride as Stennis stepped through the side-boy line of white uniforms to take his place on the dais. At the speaker's podium, the ever-dutiful Senator promised to "push for increased support" for the Navy activity now officially located in his state and for the people who were relocating from Maryland. Stennis felt a special obligation to the newcomers who left their homes in Maryland to become a part of the NSTL family in Mississippi. The conscientious Senator remembered the Navy employees' sacrifices and continued to ask about their well-being, even until his last visit to the Stennis Space Center (SSC) in 1989.[61]

Taking Care Of Business

With no definitive word from NASA Headquarters as to whether he would be named "manager" of the NSTL, or for that matter who Balch's successor might be, the dedicated Auter proceeded to manage the NSTL during the summer months of 1976. Among the business at hand was continued support for Space Shuttle engine testing, major contractual changes, and exciting successes in the AE program. By the end of July, Space Shuttle engine number 1 was tested 402.823 seconds on the A-1 test stand and engine number 2 was tested for 143.941 seconds on the A-2 test stand.[62]

---

59. NSTL Weekly Bulletin, 4 June 1976.

60. *Ibid.*

61. *Ibid.* During his visits, Senator Stennis usually asked members of the SSC staff about the well-being of the Navy personnel. The fact that he was influential in effecting the Navy's oceanographic activity relocation to Mississippi, in spite of objections to the move, worried Senator Stennis. When he was told that most Navy personnel were satisfied, Stennis related that he was pleased and felt that the move had been for the best.

62. A-1 and A-2 Test Stand History, 22 December 1994, pp. 1–2, SSCHRC.

At the same time, the NASA NSTL contracts office was in the final process of ending its 13-year-old contractual relationship with GE, awarding the technical and engineering services contract to the Computer Sciences Corporation (CSC) of El Segundo, California. NSTL also decided to select the Pan American Aerospace Service Division as a major subcontractor for support to the NSTL Range and Test Services organization. John Seiley was named manager of CSC's NSTL support team, and A.B. "Bob" Gorham, Jr., was appointed to manage Pan Am's range and test service division support team. Both managers were respected and popular with NASA and with their own employees. About 80 GE employees, some were at the site since 1963, elected to continue with either CSC or Pan Am. The contract change was to become effective 1 September 1976.[63]

Jerry Hlass Accepts The Challenge

Jerry Hlass, intimately associated with the NSTL since its very earliest days, felt destiny led him to become a permanent manager of the NSTL. Many weary NSTL employees, who knew and worked with Hlass through the years, were delighted when they learned on 18 August 1976 that he was to head their frustrated organization. An official NASA Headquarters announcement set 1 September as the effective date Hlass would take charge of the NSTL. The NSTL civil service team appreciated Auter's dedication and efforts to advance the cause of the NSTL, but they also felt purposely ignored by the NASA Headquarters managers. Indeed, some thought the shun was part of an overall scheme to let the NASA presence at the NSTL die a slow death of benign neglect.[64]

Speculation that the Headquarters might let part of the NSTL wither on the vine was not entertained by Hlass. As the NASA Headquarters man in charge of the MTF construction in 1963, Hlass was one of the early builders of the old MTF. He did not come to Mississippi to undo years of

---

63. "CSC Assumes NSTL Support," *The Sea Coast Echo*, 2 September 1976; Gilda Perkins, "Smooth Transition for NSTL Program," *The Slidell (LA) Times*, 5 September 1976.

64. Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996; NASA Notice, Key Personnel Change, "Jerry Hlass Appointed Manager of National Space Technology Laboratories," 18 August 1976, SSCHRC; Levi J. Odom, interview by Mack Herring, Picayune, MS, 5 March 1996.

his hard work and that of his NASA colleagues, or to preside over the NSTL's early demise.[65]

On the contrary, the competitive Hlass accepted the new assignment as a personal challenge and an act of "destiny" because he had been so closely associated with the NSTL facility through most of his professional years. Hlass brought credentials that especially prepared him for the task as NSTL manager when he was appointed by Todd Groo, associate administrator for Center Operations. As the NASA's director of Space Shuttle Facilities, Hlass was responsible for building manufacturing, testing, launching, and landing facilities for the Space Shuttle.[66]

Before reporting for work at NASA Headquarters in 1963, Hlass was head of the Data Acquisition Facility Section at Goddard Space Flight Center. He received a Bachelor of Mechanical Engineering degree in 1949 from North Carolina State University in Raleigh, North Carolina, and a Master of Engineering Administration degree from George Washington University in Washington, D.C. Almost as if he planned to be manager of the NSTL, Hlass selected his master's thesis on the study of the evolution of the Mississippi testing facility. In the thesis, Hlass recommended proposals for future site development, including expansion of propulsion testing and growth of the space and environmental consortium. Hlass did the study as part of a one-year

---

65. NASA Headquarters, Key Personnel Change, "Jerry Hlass Appointed Manager of National Space Technology Laboratories," 18 August 1976, SSCHRC; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996.

66. *Ibid.* Jerry Hlass told the author, 27 February 1996, that he did survey work as a young engineer in northwest Florida, near Marianna, and helped build a satellite receiving station in North Carolina. In another engineering job, Hlass helped plan and construct shopping centers for a private firm. He also gained experience working for the National Park Service designing facilities throughout the Washington, DC, area. His experience even extended overseas where he worked for the Agency for International Development, building roads for Sudan in Africa. He came to NASA in 1961 as an experienced engineer. As the NASA Headquarters man in charge of the construction of the MTF, Hlass made many trips to the site during the 1960s. In fact, he was in the area so much, he became well known by many community business people. The author became acquainted with Hlass while he was at the MTF on these early visits. During the crucial activation period, Hlass helped Heimburg and Artley expedite the preparation of the facilities for testing the S-II Saturn V second stage. The project fell behind schedule because of problems at the plant in Seal Beach, CA, and at the MTF. The awful, record-breaking, rainy weather was the culprit for some of the lost time, but management and technical problems also contributed. At Headquarters, Hlass helped justify additional funds for use in the activation. He assisted the Working Group, Heimburg, and Artley to push the tight schedules. Hlass remembers many of the dedicated personnel involved with the construction and activation, especially Tom Edwards, the right arm of Heimburg and Tessman during the period.

fellowship from NASA in 1970–1971. During that time, he travelled to the MTF and interviewed several people, including Balch.[67]

The Hlass thesis, "Search For A Role For A Large Government Test Facility," turned out to be more than a scholarly treatise. The document proved to be a useful handbook and guide used by many in future years. Although Groo instructed Hlass to go to Mississippi to "look things over" and make recommendations as to what NASA should do about the NSTL's future, Hlass brought with him his wife, the former Helen Diller of Arlington, Virginia, and their young son, George, as well as "Vroni," a Dachshund pet. They established their first Gulf Coast residence in Pass Christian, but soon made their permanent home in Long Beach.[68]

Even before he officially reported to the NSTL on 1 September 1976, Hlass started on his new assignment. He met with Henry Auter on more than one occasion during August to learn more about the NSTL's status. At the first meeting, Auter told Hlass that morale among the NSTL employees was very low. Hlass was already aware of the morale problem at the Mississippi facility. Auter, a very conservative man of good judgement, suggested that Hlass give the NSTL employees a "pep talk," and an all-hands meeting in the Gainesville Room of Building 1100 was arranged. At the meeting, Hlass assured them he was reporting for work with an "open mind," and said he wanted to hear their opinions and recommendations. He also hoped to reassure them that they had a good future by stressing the importance of the extensive rocket testing facilities at the NSTL, which he called the best in the world.[69]

After the all-hands meeting, Hlass asked Auter to prepare an NSTL status briefing, a regular management practice employed by Hlass. He said he always wanted to know what he faced when reporting to a new assignment. On 27 August, Auter presented Hlass with an excellent NSTL management

---

67. Mack Herring, NASA News Release, "Jerry Hlass Appointed Manager Of National Space Technology Laboratories," 18 August 1976, SSCHRC; I. Jerry Hlass, "Search For A Role For A Large Government Test Facility," (master's thesis, George Washington University, June 1971); Jerry Hlass, interview by Henry C. Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 437, 18 June 1991, pp. 1–3, SSCHRC; Helen Hlass, interview by Mack Herring, Long Beach, MS, 6 March 1996.

68. *Ibid.*

69. Hlass, interview, 27 February 1996; NSTL Office of Applications Engineering, "Management Review For Jerry Hlass," 27 August 1976. The Slidell meeting between Hlass and Auter illustrates the thoroughness and dedication of both men. They were concerned about their NASA organization and the welfare of the NSTL employees.

history, complete with its capabilities, progress, problems, and even options for solving the existing difficulties.[70]

Renasafication of NSTL

Known among his NASA peers as a careful, detailed planner, Jerry Hlass brought with him an agenda of issues to solve and goals to accomplish. Most of these plans were of his own making, devised after years of close association with and study of the NSTL. Some, however, were given to him by his bosses at NASA Headquarters who wanted to see the infant field installation brought into the NASA fold or abandoned altogether. In the view of many at NASA Headquarters, the NSTL was never a real part of the NASA team as a separate field installation. Those Headquarters managers who held this view of the NSTL resented the methods Balch used to do business with politicians and felt that the NSTL held more of an allegiance to its environmental consortium than it did to the NASA organization. Some still felt resentment over the manner in which Stennis and Ellender took the $10 million set-aside from their Research & Program Management (R&PM) money to get the environmental arrangement started.[71]

During his early years as manager of the installation, Hlass used his goals as a guiding light for his new team to follow. Indeed, Hlass led the small NSTL group to many lasting successes, laying a strong foundation for establishing future programs. The patient Hlass did not initiate "jump starts" to make things happen quickly. Some goals he was able to accomplish in months, but others took years. The tenacious new manager, however, never lost sight of his ultimate aspiration until his original goals were accomplished.[72]

Associate Administrator for Center Management Todd Groo was the first at NASA Headquarters to give Hlass an important assignment, which turned out to be his first management goal. Groo was concerned that the NSTL, over

70. Hlass, interview. Hlass later had his staff and other elements at the NSTL give him individual briefings. He also asked the employees to assess the problems facing the organization and their recommendations for solutions. Such a management technique, of course, invited participation and a feeling of contribution by the employees.

71. Hlass, interview by Dethloff, pp. 21–23.

72. Hlass, interview, 27 February 1996; Hlass, interview by Dethloff, pp. 36–37.

a year old, still did not have a formal "roles and responsibilities" statement. The 69 civil service employees were still working under an old MTF charter and mission statement. Groo wanted Hlass to quickly implement a new formal organization and transfer the NASA civil servants into the new structure. Aware of the morale problem at the NSTL, Groo felt a new work statement defining individual tasks of the employees would boost their sagging spirits as they approached the challenges ahead. At the same time, Groo advised Hlass to move rapidly to consolidate the NASA operations, to be completed by December 1976 before the massive Navy transfer from Maryland.[73]

A long-time friend and associate, NASA Comptroller William "Bill" Lilly, gave Hlass another important directive. Lilly and others at NASA Headquarters were concerned about the "reimbursable" policy the NSTL developed to recover funds spent on the resident agencies and assigned Hlass the task of devising a better policy. During the early 1970s when the environmental agencies first took up residence at the NSTL, a plan generous to potential tenants was developed. This was done largely to attract new tenants wanting to spend a majority of their funds on scientific programs, not on institutional matters such as rent and maintenance. In fact, Senator Ellender encouraged such a policy to get the consortium established. On the other hand, NASA was criticized by the GAO for its liberal reimbursable policy, and some rumblings from those who opposed the Navy relocation suggested that NASA was "giving space away" in Mississippi. In effect, the GAO report stated that NASA was subsidizing the tenants at the rate of $500,000 per year; and as the Navy program grew, this figure would, of course, rapidly multiply. The liberal NSTL policy, according to the GAO, would eventually leave the national taxpayers footing the bill.[74]

Another problem Hlass faced was the relocation of some 1,200 Navy employees to the NSTL. Support for the Navy move and a smooth transfer of

---

73. E.S. "Todd" Groo to I. Jerry Hlass, 12 August 1976. Groo's letter combined his congratulations to the newly appointed manager and outlined directions for actions. Top priority in the directions was the need for an "implementation of the roles and responsibilities statement for the NSTL" and the prompt transfer of the people to new NSTL roles.

74. See Chapter 8, "Growing Pains," for account of Senator Allen Ellender's work to get other agencies to come to the MTF and his suggestion for supplemental funds to help the agencies get started. For the best history and explanation of the reimbursable funding situation at the SSC, see Hlass's "Management Concept and Structure of the John C. Stennis Space Center, a [Multiagency] Federal Laboratory," Chapter II, ud., p. 10; Hlass, interview, 27 February 1976.

the oceanographic program to the NSTL were very important in the minds of NASA and Navy managers, especially in view of the emphasis placed on the relocation by Congress. Hlass, more than any other person, had the power to make the massive transfer take place as smoothly as possible.[75]

As director of Space Flight Facilities for NASA, Hlass was close to the Space Shuttle program nationwide. In fact, Headquarters asked Hlass to continue his shuttle work even after he was appointed manager of the NSTL. To do both jobs, the busy Hlass had to continue traveling about the nation, from Florida to California. Hlass knew the success of the new spaceflight program was imperative to the long-range NASA future. With this background, Hlass was determined to make sure that NSTL furnished superb institutional, facility, and technical support to the SSME and Main Propulsion Test Article (MPTA) programs. He set shuttle support as the priority item in his "roles and missions" statement. Indeed, Hlass's personal goal was that no shuttle test be held up or terminated due to facility or support failure. Such an attitude was a turnaround because Balch, in his preoccupation with the environmental consortium, was content to let the MSFC call most of the shots in the Space Shuttle Test Complex at the NSTL, even those directly associated with support matters that rightfully were the responsibility of the NSTL.[76]

Like many other problems Hlass tackled at the NSTL, he found the arrangement for support to Space Shuttle testing was especially difficult to solve. Hlass and his NSTL team found spare components woefully lacking for numerous critical testing support equipment. He called on Mark Payne, chief of Installations Operations and a veteran in the rocket business, and Payne's deputy, Dave Johnson, to help him work out test support issues.[77]

Many of Hlass's goals could not wait for long-term resolution, nor be placed on a "to do" list. AE survived on RTOPS, grants, and agreements with other agencies. The once-proud and talented NSTL rocket test engineers had to be content with support roles to the MSFC Resident Office, or work in utility housekeeping jobs servicing the resident agencies. ERL was an independent organization, answering to JSC. The Houston lab had its own in-

---

75. E.S. "Todd" Groo to I. Jerry Hlass, 12 August 1976. See Chapter 9 for more detailed information on the Navy relocation and the importance of the NSTL assisting the Navy in its move. The importance of keeping strict financial records of the process is also covered in earlier parts of this book.
76. NASA Headquarters, Key Personnel Change: Hlass, interview, 27 February 1976.
77. Hlass, interview, 27 February 1976.

house support contractor and did not use the services of the NSTL's technical or institutional support contractors. Knowing that the installation needed its own program in order to survive, Hlass set about "attracting and landing an appropriate NASA program" as one of his priority goals.[78]

Groo told Hlass that sooner or later Headquarters intended to act on consolidating the ERL and the AE, which could eventually send both organizations to Texas. Hlass asked Groo to give him the opportunity to study the situation, which had been put on hold by Stennis in February 1976 before NASA Headquarters dealt with it. Groo agreed to wait until December 1976, giving Hlass very little time to study the circumstances and make a recommendation to Headquarters. In 1975 the ERL issue was still simmering in the minds of Groo and others at NASA Headquarters, and they wanted the matter resolved once and for all. As new manager of the NSTL, the options placed before Hlass were, in his opinion, detrimental to the long-term goals of his organization.[79]

In addition to the challenges facing Hlass, morale continued to sag on the site and in the local communities. But, in order to solve the problems faced by the new organization and accomplish his own goals, Hlass first determined he had to build a strong NASA team. He also recognized the need for the good will and support of the communities as a critical element in maintaining the integrity of the accoustic buffer zone. In a strong sense, the rehabilitation of the NASA organization, and the rekindling of the community's spirit, was a monumental goal in itself.[80]

With these thoughts in mind, a determined Jerry Hlass began a long, 13-year odyssey, leading the NSTL civil servants with the hope of gaining acceptance and trust from NASA and the American public while searching for a role.[81]

---

78. Jerry Hlass, personal notes, SSCHRC.; Hlass, interview, 27 February 1976.
79. Hlass, interview, 27 February 1976; Groo to Hlass, 12 August 1976.
80. Hlass, interview, 27 February 1976; Hlass personal notes.
81. Roy Estess, interview by Dethloff, 22; A.J. "Jack" Rogers, Jr., interview by Henry C. Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 386, 4 October 1991, p. 22, SSCHRC.

CHAPTER 11

Acceptance and Trust

NASA Blue

Jerry Hlass came to the National Space Technology Laboratories (NSTL) in 1976 with a challenging, long-range plan he hoped would help guide his organization from one "mountain peak" to another, until his team climbed high enough to place a "gold star" on the blue NASA flag. With the Navy moving into the middle of the site, the Army hovering on the northern border, and the Marshall Space Flight Center (MSFC) occupying the test complex, Hlass's troops had to find a toehole somewhere on the banks of the Pearl River before starting their upward journey.[1]

Hlass began his climb by reclaiming the Earth Resources Lab (ERL) from the Computer Complex in Slidell, Louisiana, and bringing it home to the NSTL. He continued his climb upward by claiming the NSTL's rightful place in the Space Shuttle Test Complex. Before the climb was over, Hlass's

---

1. Roy Estess, interview by Henry C. Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 18 June 1991, p. 19, Stennis Space Center Historical Records Collection (henceforth referred to as SSCHRC). When Estess stated that Jerry Hlass "bleeds NASA blue," he was referring to Hlass's unwavering devotion to NASA and his defense of the NASA program. Hlass's dedication to the space agency is not unlike that of a U.S. Marine fresh out of boot camp.; E.C. "Ed" Kilgore to Jim Beggs, 29 September 1981, NASA Historical Reference Collection (henceforth referred to as the NHRC); Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 November 1996, SSCHRC.

NASA-NSTL team gained the acceptance and trust it sought. Indeed, a hallowed place of honor was secured in the NASA spaceflight family when the NSTL became the John C. Stennis Space Center (SSC) in 1988.[2]

The journey was not easy, the can-do crew traversed a trail strewn with snares and laced with seductive side-paths. They marched out of the woods and up the old Gainesville Road to the top of the hill where they shared honors at the place des drapeaux with their friend and beloved statesman, Senator John C. Stennis. To the victorious sound of trumpets, the courageous men and women of the NSTL pledged to continue their toil for future generations.[3]

All who made the march did not reach the final victory dedication in 1988. Rocket pioneer Wernher von Braun died of cancer in 1977, and Jackson Balch died of a heart attack in 1980. The deaths of these two respected men were mourned by their comrades and Gulf Coast friends, who remembered their compassion and valor during the Hurricane Camille tragedy of 1969.[4]

The Foundation

Hlass knew he had a tough time ahead. For this reason, he listed the early implementation of a Roles and Missions Statement, approved and signed by the NASA Administrator, as the number one goal on his agenda. Because of the everchanging status of the NSTL, Associate Administrator E.S. "Todd" Groo also saw the development of a Roles and Missions Statement as a top priority. During its evolution as a space and environmental complex, most of the NSTL employees had moved from one assignment to another, usually working in an ad hoc organization. Even after the NSTL was created on 14 June

---

2. *Ibid.*; Accomplishment of Jerry Hlass's goals at the NSTL are best noted in his selection twice as recipient of the "Presidential Rank of Meritorious Executive," one of the highest awards given to a civil service manager.

3. "John C. Stennis Space Center Dedication" Program Brochure, 3 August 1988, SSCHRC. President Ronald Reagan renamed the NSTL the NASA John C. Stennis Space Center at an impressive dedication ceremony on 3 August 1988.

4. "Wernher von Braun, Rocket Pioneer, Dead," *The (Biloxi/ Gulfport, MS) Daily Herald* (henceforth referred to as *The Daily Herald*), 17 June 1977; "Graveside Service Today For Former NSTL Manager Balch," *The (Biloxi/Gulfport, MS) South Mississippi Sun* (henceforth referred to as *The South Mississippi Sun*), 26 August 1980. The death of Wernher von Braun, on 16 June 1977, of cancer touched practically everyone at the NSTL. Many NSTL employees and citizens of the Mississippi Gulf Coast knew and loved the rocket pioneer. Jackson M. Balch, director of the MTF and then the NSTL from 1965 until 1975, died of a heart attack on 25 August 1980. Referred to as a "Man For All Seasons" in an editorial at the time of his death, Balch is credited with founding the multiagency consortium still thriving at the Stennis Space Center.

1974, a formal organization with assigned roles and missions had not been completed and approved by NASA Headquarters.[5]

When Hlass arrived, few NSTL employees were working in a job or organization of which they had been "officially" assigned. This confused personnel situation actually put the employees' jobs and future advancements at risk. In addition, practically no amenities existed for the NSTL civil service employees. The new manager knew he had to first initiate some positive steps to strengthen the small organization before major objectives could be achieved. For instance, the NSTL had no full-time personnel office. The personnel officer also served as a labor relations specialist and administrative officer. Personnel matters, such as promotions, awards, and important information on health and retirement, had been handled for years by the MSFC. A request for a promotion or award was forwarded to the MSFC personnel office where the request sometimes went to the bottom of the stack to await attention and action. The MSFC personnel actions, naturally, came first.[6]

Employees might be given a telephone number or address at Huntsville to call or write, but they could not receive personal assistance on personnel matters. In fact, all NSTL personnel records were stored at the MSFC and brought down to the NSTL every few years for employees to review, by appointment only. Functioning for years as an MSFC "stepchild," the morale of the NSTL workforce was harmed, even before the facility was designated a separate field installation. Later, before Hlass could secure a full-time personnel officer, the Kennedy Space Center (KSC) personnel office supported the NSTL personnel function. During the NSTL's first years under Balch and Auter, emphasis was placed on gaining new agencies for the consortium, including the Navy, and assisting the NSTL tenants as they settled into their work.[7]

The new Hlass organization was marked by simplicity, with only five functional elements and three staff offices answering to the manager. Auter and Ann Westendorf were included in the Office of the Manager. On the staff level, the new organization chart consisted of the following offices and their chiefs: the Chief Counsel, vacant at the time; the Executive Staff, which included the Assistant Manager, W.H. "Waldo" Dearing; Administrative

5. E.S. "Todd" Groo to I. Jerry Hlass, 12 August 1976, SSCHRC.

6. Hlass, interview.

7. Groo to Hlass; Jackson M. Balch to Eberhard Rees, 14 May 1974, SSCHRC.

Office and Labor Relations Office, R.E. "Ron" Groat; Public Affairs Office, Mack Herring; and Safety and Quality Office, E.A. Burke. As in most NASA organizations, the NASA audit function stood alone. The functional elements and their chiefs were: the Procurement and Contracts Office, W.L. "Bill" Goodrich; the Resources and Financial Management Office, R.V. "Bob" Callahan; the Facilities Engineering Office, A.J. "Jack" Rogers, Jr.; the Installation Operations Office, A.M. "Mark" Payne; and the Technology Application Office, Roy Estess.[8]

The first action completed by Hlass after his appointment was a "Roles and Responsibilities Statement," approved by Deputy NASA Administrator A.M. Lovelace on 2 November 1976. The statement's first declaration of priority was the institutional, facility, and technical support of the Space Shuttle Main Engine (SSME) and Space Shuttle Main Propulsion Test Article (MPTA). Hlass also included a directive for the pursuit of applications and space technology programs, and institutional support for the resident agencies at the NSTL. The main function of the statement, in Hlass's view, was to get the approval and recognition from the NASA Administrator that the NSTL did indeed have a role and purpose in the overall NASA scheme.[9]

The NSTL Gains First Program

Hlass had little time to rest in the early days with Headquarters putting pressure on him to solve a number of outstanding issues at the NSTL. One of these issues was the ongoing consolidation dilemma of Applications Engineering (AE) and the ERL. Seizing the opportunity, Hlass saw the AE-ERL consolidation issue as a way to gain a meaningful program for his new NSTL organization. Hlass promised Groo that he would "study the situation" and make a recommendation on what to do with the AE office. Since Hlass included this dilemma as one of his five functional blocks in the NSTL organization chart approved by Headquarters, the space technology

---

8. Jerry Hlass, *Memorandum to all NSTL Personnel*, "NASA/NSTL Charter, Organization Chart, and Interim Personnel Assignments," 4 November 1976, SSCHRC.

9. Hlass, interview; Hlass, interview by Dethloff. Hlass felt strongly that the NSTL's first priority was always the test mission. He even raised his voice to an employee who referred to the Space Shuttle program as a "tenant" at the NSTL. Hlass stated that "the shuttle is why we are here. That's us. They are not a tenant, that's us."

applications-oriented group was obviously a major part of the NSTL. Hlass did not want to see any program advanced that would take the AE function away, as had been proposed earlier with the AE-ERL consolidation effort.[10]

Groo, and others at NASA Headquarters, first felt the answer to the dilemma was to consolidate the ERL with AE, turn the test complex wholly over to Marshall, and stick the NSTL organization with a menial housekeeping mission. This would keep the few remaining civil servants busy for a short time, while primarily tending to the whims of the "tenants." Eventually, this scheme of drastically reducing the NSTL role would have resulted in the AE-ERL going back to Johnson Space Center (JSC) in Houston. Thankfully, by the time Jerry Hlass arrived, Senator Stennis had indefinitely postponed a consolidation of AE-ERL. Had the transfer occurred and the NSTL organization become a housekeeping element, the large Navy element and the other tenants might have engaged the General Services Administration (GSA) as their base housekeeper. Such a plan would have liberated NASA of its perceived problems and heavy burden at the Mississippi facility. After all, with the Navy oceanographic elements moving in and the Army getting ready to build a massive munitions plant, the installation was nearing the "full utilization" promised by Senator Stennis.[11]

Since Groo wanted Hlass to make a recommendation for an early decision on the consolidation plan, Hlass saw an opportunity to tender a bid to gain a substantial NASA program and reach one of his early goals for the NSTL. To ascertain if his plan to make the ERL a part of the NSTL was sound, Hlass asked Roy Estess and other AE members to convince him that their program was worth saving. Following briefings from Estess and AE colleagues, who were all dedicated to the applications role, Hlass was convinced that he should go after the ERL as a programmatic element of the NSTL. Consequently, Hlass came to the conclusion that his proposal would include the AE function (at that time an element of the NSTL organization) as part of a larger and enhanced ERL. He felt that the two components would

10. E.S. "Todd" Groo to I. Jerry Hlass, 26 May 1977. Groo summarized the decisions reached during meetings in a letter on 15 March in which he agreed to transfer ERL to the NSTL management "with approval from the Administrator's office"; Hlass, interview.

11. E.S. "Todd" Groo to Fletcher and Low, "NSTL," 20 February 1976, SSCHRC; Larry Ciko, "NASA Will Move NSTL 'Guts' From Hancock To Slidell," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*) 29 January 1976.

indeed complement each other. The big difference in Hlass's plan and the plan proposed by Groo was that the ERL would be brought under NSTL management, rather than continue being managed long distance as a remote JSC component.[12]

On 21 December 1976, Hlass met with Associate Administrator Groo and proposed that the ERL be brought under the NSTL management umbrella. Groo was shocked. He was not expecting such a proposal from Hlass because no one at Headquarters had previously thought the ERL should be brought under the NSTL's purview. After hearing Hlass's reasoning for transfer of the ERL, however, Groo agreed; but he told Hlass that the approval of JSC Director Christopher "Chris" Kraft had to be obtained first before the proposal could go to the Administrator's office for a final decision.[13]

As a result, Groo discussed the matter with Kraft. Hlass, however, played a supplementary and supporting role in convincing Dr. Kraft that transfer of the ERL to the NSTL jurisdiction was in NASA's best interest. In fact, Hlass expected to get a positive answer since he and the well-known JSC director had been close associates for years. Also Hlass had just helped Kraft justify facilities in Houston to support Space Shuttle operations. When Hlass posed the transfer to Kraft, the respected center director replied, "There's more than one way to get the job done, Jerry, but you must promise to take care of my people." Gaining Kraft's concurrence was not, however, the only backing Hlass needed to obtain. Groo also asked Hlass to inform ERL Director Wayne Mooneyhan of the decision and solicit his support. At first, Mooneyhan objected to the transfer. After all, as director of ERL, Mooneyhan was essentially his "own boss" with Kraft located in Houston. Hlass pointed out to Mooneyhan that the NSTL would take "better care" of the ERL because the Lab would be the NSTL's first new program. Hlass pledged that ERL's needs would be foremost in his mind and would, therefore, enjoy top priority in the support efforts of all elements of the NSTL organization. Hlass argued that because of his management of the dominating Space Shuttle program, Kraft could not heap the attention on the ERL that Hlass was prepared to do as manager of the NSTL.[14]

---

12. Hlass, interview.
13. E.S. "Todd" Groo to I. Jerry Hlass, 26 May 1977, SSCHRC; Hlass, interview; Personal Notes of Jerry Hlass, SSCHRC.
14. Hlass, interview; Hlass, interview by Dethloff, p. 24.

Hlass experienced a strong sense of victory when Groo, on 26 May 1977, informed Hlass that Deputy Administrator Lovelace approved the transfer of the Lab to the NSTL. Groo made several stipulations to Hlass concerning the transfer, one being that Mooneyhan remain director of the ERL and also assume the additional position of deputy manager for programs at the NSTL. Groo told Hlass that he would "consider" additional personnel for a new Regional Applications Transfer Program function that was being developed at the NSTL. In addition, Groo authorized Hlass to proceed with planning for a building at the NSTL to house a training facility for the regional program. The rest of the ERL remained at Slidell until physical space, which had become a premium with the Navy moving in, became available. The ultimate move of the entire ERL would come later.[15]

Of course, the transfer of the ERL to the NSTL, where the Lab could become a programmatic element of the Mississippi facility, was exceptionally good news for Hlass because he realized the "victory" would serve as a lift to the morale of the NSTL personnel. A smiling Hlass assembled all his employees at the Rouchon House for a meeting. He stood on a small balcony of the rustic lodge facing the employees, who stood under huge live oaks on the banks of the Pearl River, and told them of the ERL transfer to the NSTL. Many were stunned because victories for the small group had been few. But when the news sank in, the employees applauded, believing their future would be brighter.[16]

Senator Stennis, elated at the NSTL's acquisition of the ERL program, said the organizational change was "another recognition at the highest levels of NASA of the growing importance of [the] NSTL." Stennis also pointed out that the change would bring important programs such as the new Regional Applications Program (RAP) to the Mississippi facility. RAP was designed to provide training for state and local personnel in 17 "Sunbelt" states to apply and utilize remotely sensed data acquired from satellites for more efficient management of Earth's resources. Stennis beleived that "the practical application of space technology to down-to-earth problems and opportunities [was] one of the most promising aspects of NASA's activities."[17]

---

15. E.S. Groo to I. Jerry Hlass, 26 May 1977, SSCHRC.

16. Hlass, interview.

17. Neville "Jake" Jacobs, "Earth Resources Laboratory Consolidated At NASA-NSTL," *The Sea Coast Echo*, 2 June 1977.

Raising The Rent

The need to make the Navy's oceanographic program's move to the NSTL smooth was another important issue assigned to Hlass by the Headquarters during the early phase of his administration. Many at NASA Headquarters had been deeply immersed in the drawn-out relocation of the 1,200 Naval Oceanographic Office personnel. All the while, Groo, Lilly, Curtin and their colleagues in Washington worked under a great deal of pressure from the Congress and NASA to see the Navy move through with as few bumps as possible. Certainly NASA Headquarters did not want further negotiations to occur in the newspapers or on television. For well over a year, headlines, columns, and editorials concerning the affair frequented the newspapers in Washington and on the Gulf Coast.[18]

With the decisions made and the move under way, many preparations still had to be made by NASA at the NSTL in order to receive and host the large Navy element. Providing office and laboratory working space, of course, was foremost on everyone's mind. But before anything could happen, NASA knew it had to develop a new policy for assessing the shared costs charged to the tenants at the NSTL.[19]

In fact, the GAO had previously criticized NASA for the method it used to charge reimbursable costs to its tenants for their floor space and services. An audit revealed that NASA was subsidizing the tenants by approximately $500,000 per year. In an earlier discussion with Admiral Snyder, Hlass found the Navy would not object to adjustments in the agreed-on reimbursable costs of $4.60 per square foot of office space. The rates generally were computed for laboratory, computer, and air-conditioned storage, with non-air-conditioned storage being offered at a lower rate of $2.00 per square foot.[20]

Coming up with a fair-share cost for all 17 tenants on the base was not an easy task. For instance, in November 1973, the investigative staff of the House Appropriations Committee reported that "all" tenants at the NSTL indicated the costs of the support services were unreasonable, and they had to

---

18. E.S. "Todd" Groo to Administrator, "Status of Report on Proposed Move To NSTL," 22 April 1975, SSCHRC; Hlass, interview.
19. *Ibid.*
20. E.C. "Ed" Kilgore to Admiral J. Edward Snyder, Jr., 23 April 1975, SSCHRC.

spend an "abnormal" amount of money to obtain day-to-day services. On the other hand, Senator Charles Mathias of Maryland said NASA was subsidizing the tenants to the tune of 40 cents per square foot. Given these conflicting claims, it is not suprising that the Senate Appropriations Committee held lengthy hearings on 25 June 1975 on the subject of reimbursable costs of the Navy at the NSTL and extracted promises from Fletcher, Lilly, and Curtin that close attention would be paid to make sure that the cost incurred by the Navy would be properly recovered by NASA.[21]

Hlass put together his first of many "teams" to tackle the reimbursable charge policy problem. R.V. "Bob" Callahan, Chief of the Resources and Financial Management Office, was the first member of the Hlass team called to start work on developing a new charge policy. Later, Hlass and Callahan asked Levi J. Odom, Theodore Franklin, Dave Hobgood, Morris Crowder, and Clarence Hudson to join in the search for a reimbursable policy that satisfied both NASA Headquarters and NSTL tenants. The Headquarters felt so strongly that the system needed immediate attention that Bill Lilly assigned personnel to join the NSTL finance team, with William "Bill" Waters as his lead man.[22]

The group finally boiled their studies down to six options to consider for charging the tenants. The team settled on "Option Six," which basically contained two charges—per square foot of floor space used by each agency and a two-person occupancy charge based on personnel head-count. The team felt this combination would be "fair and equitable" for the small agencies, as well as for the Navy. The new policy, however, raised the rent for all tenants and resulted in a quadrupled rent increase for some of the smaller resident agencies. The only exception to the rule involved universities and state agencies. The team reasoned that universities provided essential higher education services to NASA and all resident agencies and should be encouraged to establish and enhance their services. Also, cooperation with state agencies in support of technology transfer was deemed to be an important goal and mission for NASA and the other agencies.[23]

Another component developed by the "reimbursable team" was a refined policy for "demand" charges. The demand charges were for technical or facil-

---

21. Congressional Hearing, "Agricultural-Environmental and Consumer Protection Appropriations For 1975," Subcommittee of the House Appropriations Committee, transcript, 93rd Congress, 2nd Session, Part 7, p. 82.
22. Levi Odom, interview by Mack Herring, Picayune, MS, 8 March 1996.
23. *Ibid.*; Theodore "Ted" Franklin, interview by Mack Herring, SSC, MS, 13 March 1996.

ity services provided to the tenants, such as the calibration of an instrument or a modification to a building to better suit a tenant's technical or housing needs. These charges were incurred at the completion of work by a NASA support contractor after a tenant submitted a form called a Technical Work Request (TWR) or a Facility Services Request (FSR). Collecting such charges was a "one time" cost and added to the overhead of the cost NASA incurred. After the schemes were developed, Hlass had the difficult job of convincing NASA Headquarters that his new policy was fair and equitable. Hlass said his test of the policy was simply, "Do we overcharge the agencies, or do we use NASA money to subsidize a tenant?" If the new system could answer these questions appropriately, the charge was considered fair. The policy was difficult to sell in Washington, D.C., because there was a perception, originating with a GAO report, that "those guys at NSTL worried more about the tenants than they did [about] NASA."[24]

When the package was completed, Hlass presented the new reimbursable policy to Lilly and Groo for approval. Since both men had followed the new policy's development through the spring of 1977, they knew it met their standards as "fair and equitable" for both NASA and the NSTL tenants. The system was approved and scheduled to take effect 1 October 1977. Hlass then called his first meeting of all agency heads to announce the new reimbursable policy and, in effect, raise the tenants' rents.[25]

Hlass asked his wife Helen to bake a cake for the meeting with the agency heads. This down-to-earth, homey touch became a Jerry Hlass trademark. At the meeting, Hlass told agency chiefs that he "had good news and bad news." The good news was a commitment to provide the agencies with the highest level of institutional and technical support services. The bad news was that the rent had just been increased.[26]

The settling of the reimbursable policy problem, however, is only one example of the many projects and problems faced by Hlass and his NASA-NSTL team. At the top of the list was the task of helping the Navy's oceanographers find physical space at the NSTL to accommodate the 1,200 people on their way to Mississippi. The move eventually took two years to

---

24. SSC Management Handbook by Jerry Hlass, "Management Concept and Structure of the John C. Stennis Space Center, a Multiagency Federal Laboratory," pp. 11-14, SSCHRC; Franklin, interview; Hlass, interview.

25. Hlass, "Management Concept..."; Hlass, interview.

26. Hlass, interview.

complete, but Hlass and his finance team laid a sound fiscal foundation to accommodate the Navy and their fellow tenants at the NSTL. In fact, NASA Deputy Administrator A.M. Lovelace told Hlass that the NSTL reimbursable policy worked out so well he wanted it instituted at other NASA centers where NASA had similar cases of host-tenant relationships.[27]

Putting People First

Hlass continued to check off items from his list of "actions" he had brought with him to the NSTL, laying a foundation for his renasafication program, which was intended to build a stronger NASA organization for future development at the Mississippi facility. With the completion of the roles and responsibilities statement, the acquisition of the ERL as an NSTL program, and the development of a "fair and equitable" reimbursable policy, the busy manager was well on his way toward completion of his initial goals.[28]

But Hlass knew that the lagging morale that Auter and Groo warned him of had received prompt attention, and the NSTL team began to blossom in the Mississippi spring of 1977. Major challenges lay ahead for his people, including overhauling the Space Shuttle support effort, helping the Navy with its relocation, and ensuring "tenant satisfaction" by applying sound management for the multiagency installation. The community around the sprawling site also needed a boost. Indeed, the populace in the surrounding towns and cities was beginning to tire in its support of the NASA installation after years of continued change and ups and downs that resembled a ride on the "Wild Mouse" rollercoaster in nearby New Orleans. It was time, the local citizens thought, that they should reap some of the benefits from the location of the NASA facility.[29]

Hlass began a two-prong attack to improve the morale of his small NASA civil servant team (which had grown to 92), their contract or support forces, and the community that had stood by the MTF/NSTL through thick and thin. As an avid participant and follower of sports activities, Hlass knew

---

27. *Ibid.*; Jerry Hlass, interview by Dethloff, pp. 30–31.
28. *Ibid.*; Groo to Hlass.
29. *Ibid.*; David A. Farrell, "Hlass Says NSTL Big Boost For Area," *Picayune (MS) Item*, 25 August 1978.

he needed to develop his NSTL team spirit in order to achieve maximum results at work.[30]

His natural instincts and ability to attract and "get along" with people, coupled with his graduate studies in engineering management, taught Hlass that he also had to have the "good will and support" of the community in order to be successful in his job as manager of the NSTL. This community support was more important at the NSTL than at most other private and governmental installations because of the absolute need to maintain the integrity of the approximately 125,000-acre buffer zone necessary for propulsion testing. Hlass instituted a "putting people first" program to gain support on both fronts—at the installation and in the towns surrounding the NSTL. The local communities, through their strong politicians, had the ability to help him defend the need for the buffer zone against those who wanted pieces of it back for commercial or personal endeavors.[31]

An early effort to organize and reassign the NSTL personnel into a cohesive, efficient management organization involved the development of a personnel services plan between the NSTL management and the MSFC Management Office. In November 1976, after the Roles and Missions (responsibility) Statement and the new organization plan were approved by NASA's Deputy Administrator, Hlass solicited the MSFC to help in a reclassification of the NASA-NSTL employees to complete stabilization of his organization. To Hlass's chagrin, the MSFC Manpower Office recommended "downgrades" for 16 of the positions studied.[32]

Since work levels had actually increased since development of the NASA-NSTL organization plan had its last "official" version approved in 1972, and since the NSTL was by 1977 an independent field installation of NASA, Hlass deemed the findings by the MSFC experts "intolerable." In fact, he became furious and submitted a rebuttal to NASA Headquarters, telling Groo in March 1977 that he "could have the NSTL manager's job [back]" if the recommendations that the manpower study conducted by MSFC were carried out. Groo, obviously well-pleased with the accomplishments of the tenacious Hlass, agreed not to downgrade any positions and

---

30. Jerry Hlass, personal notes, SSCHRC.

31. Pamela Heinecke, "Buffer Zone Assures Future Of NSTL Site," *The (Biloxi/Gulfport, MS) Sun-Herald* (henceforth referred to as *The Sun-Herald*), 11 May 1980.

32. Hlass, interview; Position Paper, "Reorganization And Reassignment," NSTL, 11 March 1977, SSCHRC.

ordered another study. The spring of 1977, with the new study under way, was a particularly worrisome time for the new manager who knew that his drive to increase morale at the NSTL organization would be totally destroyed if people actually lost grades in the new organization. The new study recommended no employee downgrades.[33]

With this victory added to his earlier goals, Hlass recruited the organization's first personnel officer, Elbert C. McWilliams. McWilliams was extremely aggressive and initiated several programs to assist the NSTL employees. The personnel transactions and day-to-day record keeping, however, were transferred to the KSC. Unfortunately, Hlass sent McWilliams to a NASA Human Resources Conference in Atlanta where his skills and talents were recognized, and he was offered a job with the Office of Personnel Management (OPM) which he accepted. When McWilliams left, Hlass recruited Ronnie E. Carter, another career professional personnel officer. Carter quickly gained the confidence of Hlass, but more importantly, he gained the trust of his fellow NSTL employees. Under the care of Carter, the Personnel Office began to function as a normal office for the very first time.[34]

The neglected NSTL employees began to receive long-overdue promotions, joined the NASA Awards program, and finally had their own Personnel Office capable of answering questions and assisting employees with their NASA career decisions. Hlass even added a special touch to boost employee morale. He instituted a special "Awards Program," in which all employees were assembled on an annual basis in the auditorium of the Central Control Building where the awards and promotions were handed out.[35]

Top NASA personnel from the Headquarters, such as the Administrator, were invited down to address the NSTL group and assist in the program. Adding the NSTL "family" touch, Hlass started a custom of staging an employee picnic down by the Pearl River after the ceremony, with employees and their families encouraged to participate. At the same time, several NSTL Financial Management Office employees, under the watchful guidance of

---

33. *Ibid.*

34. "McWilliams Named Personnel Officer," *Lagniappe*, 17 March 1978, SSCHRC; "Carter Selected Personnel Officer," *Lagniappe*, 22 October 1979, SSCHRC. Associate Administrator for Management Operations Ed Kilgore was one of the early Headquarters officials who came to the NSTL and presented awards.

35. Mack Herring, NASA-NSTL Press Release, "NSTL Employees Receive Awards," 25 September 1981, SSCHRC.

chefs Ted Franklin and Joe Weatherspoon, cooked barbecue, crawfish, and shrimp for picnics that were primarily attended by the employees working in the office and their families. Over time, Don Kelly, Herman Hattaway, and Greg Fletcher were recruited to help with the culinary chores.[36]

Hlass attended one of the finance office picnics and persuaded the "cooks" to prepare the food for the entire NASA-NSTL workforce picnics. In fact, the picnics became well known over the entire Agency and were usually held in connection with important NASA meetings conducted at the NSTL so visitors could join in the NASA-NSTL family celebration. NASA administrators, center directors, and astronauts became regulars at these picnics and helped pay tribute to the employees receiving recognition. This new policy of "publicly" recognizing the NASA-NSTL employee achievements was unusual for the employees who had previously been ushered into their supervisor's office and given a handshake "if" they were fortunate enough to receive a rare promotion or award. Their personnel records, maintained for years in Huntsville, were brought down and entered into the NSTL records systems. Employees for the first time had the ability to examine their service records, and information was available in a routine fashion, similar to any other government organization.[37]

Hlass did not limit his morale-building program to the small NSTL civil servant group, which numbered only 65 people when he arrived. The new manager was aware that the success of the Mississippi facility and its programs lay with the approximately 1,100 contractor personnel. They not only conducted Space Shuttle engine tests but also actually operated the facility with their institutional, technical, and test support. Hlass made sure the contractor forces were represented in the awards programs and encouraged their managements to participate in employee-relations programs. Even more importantly, he often visited the shops and other work areas and, similar to von Braun, exhibited genuine interest in each contractor's work.[38]

Likewise, Hlass developed and maintained good relations with the Naval Oceanographic Office and the 17 other resident agencies at the NSTL. He called his policy for the cooperating agencies at the facility "tenant satisfaction." As part of this program, Hlass set regular meetings with the chiefs of

---

36. *Ibid.*
37. *Ibid.*
38. Hlass, interview.

the various agencies during which he utilized a formal agenda, with each agency presenting an "interesting aspect" of their work to the rest of the group. He also discussed any changes, ranging from the mundane to the significant, that NASA proposed in its support of the agencies. These changes included allocation of parking spaces, the need for medical facilities, available day care for employees' young children, and a fitness program and gymnasium center. In fact, from several of these sessions came the first-class medical clinic, child-care facility, auto service station, dry cleaners, and fitness center for all NSTL employees. Hlass gained, as a direct response to this management style, the confidence and trust of most of the agency heads.[39]

Good Will And Support

Before being stationed at the NSTL, Hlass became very familiar with the communities surrounding the test site. During the early 1960s, he flew into New Orleans on several occasions, rented a car, and drove the winding, two-lane U.S. Highway 90 through the marshes to the Gulf Coast. During these trips he cultivated a number of friends in the Pass Christian and Long Beach area and became acquainted with restaurants, motels, and other businesses he frequented. As chief of Space Flight Facilities in the early 1970s, Hlass reacquainted himself with the area, making trips to the site to follow modifications of the A-1 and A-2 test stands and support facilities in the Test Complex.[40]

While working on his master's thesis in 1970–1971, he plunged into an in-depth study of the early history and the development and community impact of the testing facility on the Gulf Coast area. To accomplish the task, he consulted with Jackson Balch and with Dr. Mary Holman of George Washington University, who had by that time completed a community impact study for NASA. Consequently, the newly appointed manager brought a historical and current knowledge of the community situation on the Gulf Coast that he had gained as a result of his exposure to and study of the area while working on his graduate degree. Through his studies, Hlass

39. "Medical Services Clinic Provides Employee Health Protection on Job," *Lagniappe*, 8 December 1978, SSCHRC.

40. Hlass, interview.

felt the community developed a negative feeling toward NASA because of the political battles associated with personnel downsizing and the site's evolution from a single-purpose rocket test site to a multiagency space and environmental complex.[41]

Hlass feared the negative community feelings could evolve into "ammunition" for some buffer zone landowners to attempt to regain possession of parts of the huge landmass surrounding the installation that NASA held in easements. Hlass believed that the "chipping away," should parcels of land be returned, could lead to wholesale losses of land. Without the buffer zone, NASA's ability to test large propulsion systems would also be lost. Hlass was not the only official at the NSTL to recognize the potential damage that could result from buffer land loss. Admiral Snyder also confirmed that the Navy was "not interested" in the site without the buffer zone.[42]

The encroachment of private and commercial developments on the MSFC in Huntsville was essentially the reason the giant propulsion center was extremely limited in their rocket-testing business by the early 1970s. Only small development engines could be tested for short durations at the MSFC, and larger engines were limited to short-duration runs because homes and businesses were built right up to the security fence. Hlass knew he had to maintain the good will and support of the surrounding communities in order to preserve the NSTL buffer zone for future test programs.[43]

For this reason, Hlass immediately began to meet privately with such influential community leaders as Leo Seal, Jr., of Bay St. Louis, who was president of the Hancock Bank; Mayor Grady Thigpen of Picayune; and long-time Coast resident Roy Baxter, Jr., of Pearlington. Hlass sought their opinions concerning the NASA installation, and he listened to their recommendations for improving relations between the site and the communities.[44]

Hlass asked for the advice of his own staff members and enlisted their help in working with the various communities in which they resided. For example, in the Mississippi communities, he depended on A.J. "Jack" Rogers, Jr., for the Gulfport area; Mark Payne for the Long Beach community; Mack

---

41. I. Jerry Hlass, "Search For A Role For A Large Government Test Facility" (master's thesis, George Washington University, June 1971), pp. 1–10.
42. "Outlook for Coast Bright," *The Daily Herald*, 24 February 1978.
43. Heinecke, "Buffer Zone...," *The Sun-Herald*.
44. Hlass, interview.

Herring for Pass Christian and Harrison County; Ed Ling for the Bay St. Louis-Waveland area and Hancock County; and Henry Auter and Roy Estess for Picayune and Pearl River County; and in the Louisiana communities he called upon Bob Callahan for Slidell and St. Tammany Parish.[45]

Hlass also instituted an annual "Community Leaders' Breakfast" and invited elected officials, business people, civic leaders, and educators to meet at the NSTL for a breakfast briefing and discussions. After the meal, Hlass would address the community visitors with a full and meaningful status report on the installation's progress. Hlass and members of his staff would spend weeks compiling the latest information on where personnel lived, annual salaries, and education levels. He would illustrate the total dollar impact of the facility in Mississippi and Louisiana, inclusive of the area within a "50-mile radius" of the NSTL. In addition, Hlass highlighted potential new programs and outlined the status of the joint NSTL/community programs, such as fire protection and mosquito control.[46]

These meetings were very popular among the community leaders and attracted 70–100 people. Not only did the leaders appreciate the useful information, but they also enjoyed the warm Hlass hospitality.[47]

Hlass called his first community gathering a "get acquainted" meeting and invited leaders from Harrison, Pearl River, and Hancock Counties in Mississippi, and St. Tammany Parish in Louisiana to the NSTL. Many of the invitees had already met the new manager, but the 2 August 1977 session was the first in which Hlass shared the status of the NSTL. He stressed the need to maintain the buffer zone, telling the leaders that the acoustic easement area around the site gave the NSTL a "competitive advantage" in testing rockets.[48]

Hlass also told the group the population of the NSTL, as of 26 July 1977, was 2,600 employees and would climb to 3,100 in August 1978 when the Navy's first new building was completed and additional personnel arrived from Maryland. He proudly pointed out that the NSTL had pumped some $64 million into the local economy the previous year. Hlass also told his community "friends" that NSTL employees set a goal in 1978 of $70,000 in

---

45. *Ibid.*; Hlass frequently asked members of his staff to "speak with community leaders," and he listened to their recommendations of key people in their communities that he should contact personally.

46. Neville "Jake" Jacob, "Buffer Zone is a Must," *Sea Coast Echo*, 4 August 1977.

47. *Ibid.*

48. *Ibid.*

charitable gifts to be distributed by the United Way. The program, which has come to be known as the Combined Agency Campaign, was initiated as a result of the NSTL employee concern over the needs of those less fortunate in the counties and parishes in which they lived.[49]

Hlass also revealed other statistics of special interest to the local leaders. He said that of the total number of current employees at the NSTL, 448 resided in Hancock County, 643 had homes in Harrison County, 786 lived in Pearl River County, 632 resided in St. Tammany Parish and other Louisiana locations, and 81 lived in other Mississippi areas. Hlass also went into great detail explaining the missions of NASA and the resident agencies, trying to make sure the community leaders left the meeting with a clear understanding of the work under way at the NSTL.[50]

Hlass's first venture into the public domain with his "good neighbor" policy proved to be highly successful. The community briefing received positive write-ups in the Gulf Coast newspapers. Following the meeting, Maria Watson wrote an "analysis" of the NSTL that appeared in *The (Gulfport, MS) Sun-Herald* offering a "capsulized" view of the American space program's intricacies and its integration into the "everyday life of the average citizen." David Farrell wrote in a very positive *Picayune (MS) Item* editorial, entitled "A Good Neighbor Is NSTL Facility," that the NSTL was truly in the business of helping people and that Picayune was "very fortunate to have such a good neighbor." Later, Hlass took his positive message on the road, seeking "good will and support" at such meetings as the annual "Hancock Bank Economic Symposium," and the annual Chamber of Commerce banquets in Picayune and Hancock County. Indeed, the new manager quickly became a popular figure along the Gulf Coast.[51]

Follow The Money

Hlass was, according to at least one of his closest associates, a total "NASA man who would bleed NASA blue if he were cut." He shared the

---

49. "Activities Diversified Now at NSTL," *Picayune Item*, 4 August 1977.
50. *Ibid.*
51. *Ibid.*

view of most Headquarters and field center managers that the success of the nation's civil space program would fly on the wings of the new Space Shuttle. At the beginning of his tenure as the NSTL manager, Hlass placed the support of SSME testing as the number one objective on his "Roles and Responsibilities" statement.[52]

By late summer 1977, with his other goals accomplished or moving toward completion, Hlass began to focus on his main priority—strengthening the NSTL Space Shuttle test-support team and developing a strong foundation for future propulsion programs. To accomplish this task, he had to guide his team through an equally determined MSFC effort to keep total control of the entire Space Shuttle Test Complex. In fact, the MSFC program office even hampered the NSTL from maintaining the quality and readiness of the test and support facilities within its own complex.[53]

The idiom, "Follow the Money," was most applicable in solving the dilemma in which Hlass and his NSTL Space Shuttle support team found themselves. To be sure, Hlass's bosses at NASA Headquarters were expecting their new man in Mississippi to ensure support of the SSME development program and the MPTA. In addition, if something went wrong with a test that was deemed the fault of the complicated and extensive support effort, Hlass would be held responsible.[54]

The funding for the shuttle program, however, was not controlled by the NSTL. True, the funds came from the Office of Space Flight in Washington, passed through the MSFC program office, and were then placed in the NSTL Financial Management Office. With part of these funds, the NSTL provided shuttle test support through a contractual arrangement with Computer Sciences Corporation (CSC), its technical support contractor, and Pan Am's Range and Test Support Services Laboratory, which functioned as a subcontractor to CSC.[55]

---

52. Maria Watson, "Effects of Space Program Becomes Evident on Coast," *The Sun-Herald*, 14 August 1977; David Farrell, "A Good Neighbor is NSTL," *Picayune Item*, 7 August 1977; David Farrell, "Hlass Says NSTL Big Boost for Area," *Picayune Item*, 25 August 1978; Jimmy Bell, "Outlook for Coast Bright," *Picayune Item*, 24 February 1978.

53. Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996; Wayne Roberts, interview by Mack Herring, Long Beach, MS, 28 March 1996; Marvin Lee "Marv" Carpenter, interview by Mack Herring, Pass Christian, MS, 29 March 1996; J. Stephens "Steve" Dick, interview by Mack Herring, Pass Christian, MS, 28 March 1996.

54. *Ibid.*

55. *Ibid.*

The NSTL management problem centered around the fact that the MSFC Resident Office directed the Space Shuttle support work of CSC and Pan Am, leaving the NSTL unable to control the efforts of its own contractors. Problems erupted because of the differing operating philosophies of the MSFC and the NSTL. MSFC managers took a typical program office view. They were more interested in the short-term operation, with their sights set on the testing of the shuttle engines and the MPTA in time to support the first shuttle launch. The NSTL was interested in the same scenario, but the Mississippi organization also had to consider the care and maintenance of the installation—including propellant barges, high-pressure gas and water systems, instrumentation, and even the NSTL test stands used by the MSFC. On the other hand, the MSFC wanted to use the funds for its current testing program, conducting the NSTL shuttle engine tests at the lowest possible cost.[56]

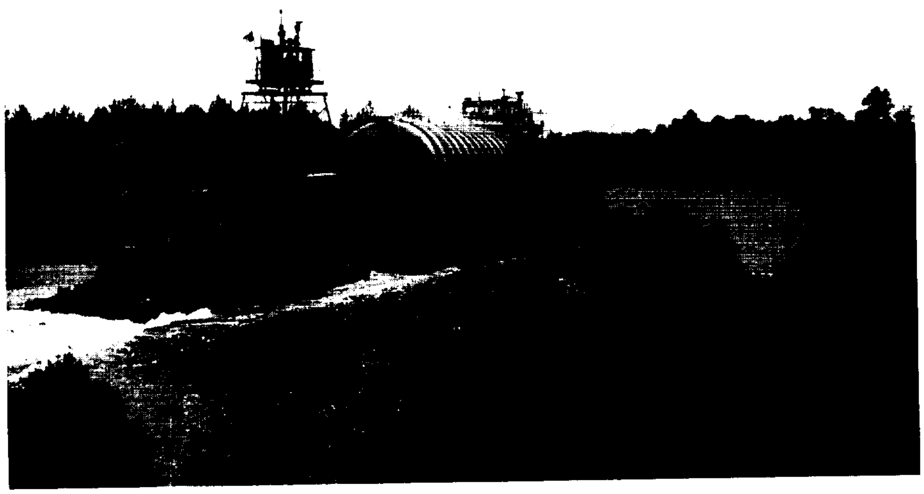
The NSTL managers and engineers believed their MSFC counterparts did not share their interest or concern for maintenance and long-term care of the NSTL. Furthermore, Hlass contended that critical spare parts, such as exotic valves used on the barges and in the high-pressure gas facility, were not available to support the test program if an existing part failed. Some parts could take a year to replace, and the entire shuttle program could be held up.[57]

Naturally, Hlass did not want his test team to be responsible for such an occurrence, especially if a better test support operating plan could be instituted that would prevent the delay of a shuttle test and launch. At the same time, however, the MSFC did not want to lose the testing "independence" it enjoyed at the NSTL. In order to fully achieve the goal of never holding up a test, Hlass and his team knew they had to control the money sent from NASA Headquarters to the MSFC for use in shuttle engine testing at the NSTL facility.[58]

For instance, the hulls of the critical propellant barges were rusting and badly in need of repair, but the MSFC would not allow the NSTL support personnel to spend shuttle money on the task. That attitude was not acceptable to Hlass or his people, who were generally very frugal with their funding and

---

56. "NASA Negotiates Pan American Services Contract," *Picayune Item*, 30 June 1978; Mack Herring, NASA-NSTL News Release, "NASA Extends CSC Technical Services Contract," 1 September 1979, SSCHRC; Pat Mooney, interview by Mack Herring, Slidell, LA, 30 March 1996; Briefing Notes, "Welcome to Pan Am's World in Southern Mississippi," circa September 1978, SSCHRC.
57. Dick, interview; Hlass, interview; Roberts, interview.
58. Hlass, interview.



The tugboat Apollo heads down river to New Orleans for another load of liquid hydrogen to support Space Shuttle Main Engine testing. (SSC-78-447-27)

equipment. At the same time, however, the NSTL team was also interested in the proper care of their installation as well as the success of the Space Shuttle engine test program.[59]

Hlass worked very hard during his first few years as NSTL manager to secure the funds to provide first-class technical support to the SSME and MPTA test programs. He spent hours with Bill Lilly, Richard "Dick" Wisniewski, and Tommy Newman at the Headquarters, presenting the NSTL side of the funding story. Indeed, Hlass also "walked the walk" to strengthen the test support effort by using funds he helped secure for the upgrade of the laboratories and their services, as well as taking care of the big ticket components inside the Space Shuttle Test Complex.[60]

59. NSTL Director's Office; "Technical Support to Shuttle Test Program," 1976, SSCHRC; Roberts, interview; Hlass, interview.
60. *Ibid.*; Dick, interview.

NASA essentially had two types of funding that could accomplish the goals Hlass and the NASA-NSTL team sought to achieve: (1) Research and Program Management (R&PM) and (2) Research and Development (R&D). Hlass had some success in obtaining R&PM money when the ERL was transferred back to the NSTL. Approximately $600,000 of that fund came to the Mississippi facility as a result of the ERL transfer. Hlass and members of his staff finally convinced Lilly and Wisniewski that placing the R&D Space Shuttle funds directly in the NSTL's hands and giving the test support effort control of its own destiny was the "right thing to do." Along the way, however, Hlass and his engineers, A.J. "Jack" Rogers, Jr.; Harry Guin; J. Stephens "Steve" Dick; Mark Payne; Dave Johnson; and Jim Coward; made their "pitch" several times.[61]

Guin, with his subtle and persistent "sales" personality, "softened up" the Headquarters officials with informal chats. Hlass actually took the Headquarters personnel around the NSTL site, showing them the rusting propellant barge. The NSTL manager gained the confidence of Acting NASA Administrator Lovelace, who directed his staff to "work [out] the NSTL funding problem." The process was slowed by MSFC program officials, who presented a different view on how the money should be spent. The MSFC could not deny they received anything less than superb support from the NSTL test complex. In fact, no test had ever been held up due to the NSTL support efforts. The first R&PM funds for shuttle support to go directly to the NSTL totalled only $1 million. By 1984, that figure grew to about $7 million and remained at that level for several years. The most important aspect of obtaining the R&PM money, in Hlass's mind, was the recognition that the NSTL was now a permanent field installation and should be supported in a manner similar to other NASA sister installations, such as MSFC, JSC, and KSC, with appropriate R&PM and R&D funding. At that time, component facilities in the NASA scheme of field installations did not independently receive R&PM money. Once they got these funds, Hlass and his people could begin to upgrade their facilities and laboratories and purchase needed equipment to take care of their base for long-range shuttle testing and for future test programs. Similar and successful efforts eventually led to the NSTL receiving direct funding from shuttle R&D funds in support of the facility's shuttle

61. Hlass, interview; Franklin, interview; Dick, interview.

test support responsibilities. As Steve Dick observed, Hlass led the NSTL team on its quest to "regain our heritage" in the test complex.[62]

In Support Of The Space Shuttle

The "money trail" for Space Shuttle test support and upkeep of the NSTL had little, if any, effect on the day-to-day support of shuttle engine testing. Those involved in the support effort worked as a team, but came from several organizational elements. The engineers and technicians responsible were attached to the MSFC Resident Office, the NASA Facilities Engineering Office, Propulsion Test Support Division, the Pan Am Range and Test Services Laboratory, CSC's Laboratory and Field Services Branch, and Pan Am's Special Projects Division.[63]

Most of the personnel had worked together in other organizations and on different projects for years. Many NSTL test complex employees had toiled through the construction and activation of the site in the 1960s, tested the Saturn stages, reactivated the test complex for the shuttle, and now had reunited for developmental and certification testing of the SSMEs and the MPT. Many shifted jobs with the changing of the various onsite contractors—GE, CSC, Global, and Pan Am. Only the small NASA civil service staff remained fairly constant. A few NASA employees, however, went to work with the onsite contractors during the declining years immediately after the Apollo program. Some left, but returned with the shuttle program. The support teams personally knew the Rocketdyne and Rockwell engineers and technicians who prepared the engines and conducted the static firings. Members of the test and support teams played golf, fished, and met together after work on a social basis.[64]

The management negotiations conducted by their bosses up and down the chain of command had little effect on their job performance. As Roscoe

62. NSTL Director's Office, "Technical Support to Shuttle Test Program," 1977, SSCHRC; Hlass, interview; Franklin, interview.

63. NSTL Director's Office, "Technical Support to Shuttle Test Program," 1977; Hlass, interview.

64. Marvin Lee "Marv" Carpenter, interview by Mack Herring, Pass Christian, MS, 25-26 March 1996; Lewis B. "Lou" Nelson, interview by Mack Herring, SSC, 25 March 1996; Roscoe Nicholson, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 404, 20 April 1992, p. 21, SSCHRC.

Nicholson, Rocketdyne, once observed, "We leave the politics to you guys," referring to the coat and tie managers located in Building 1100, well outside the Test Complex. Together, the test support personnel made up what propulsion expert J.R. Thompson later referred to as the "best rocket test team in the world." Indeed, they were called on many times to prove Thompson's glowing appraisal.[65]

Typical of the experienced personnel Thompson spoke of was Wayne Roberts, who followed Bob Gorham as head of the NSTL Range and Test Services Project for Pan Am. With a fluctuating number of about 50 engineers and technicians, Roberts's group was the largest of the support elements. Roberts, a graduate of the University of Southern Mississippi, was one of the first eight people to join the GE Apollo support group at the MSFC in 1962. As a native of the community of Daisy Vestry in Jackson County, Mississippi, coming to the MTF-NSTL was "coming home" for Roberts. He accepted five NASA Public Service Awards, the first of which was awarded in 1981 for the work he and his group, which included Bill George and Gary Lehr, accomplished.[66]

Roberts, however, was one of many competent and experienced NSTL engineers. Another engineer who worked alongside Roberts in the development of Space Shuttle support was Steve Dick, a graduate of West Point, who served as a senior test engineer with Boeing and as a project engineer with GE. Dick later became project manager for Global Associates' Base Projects Division. He helped reactivate the test stands and joined NASA's Facilities Engineering Office with A.J. "Jack" Rogers, Jr., in 1978.[67]

Pat Mooney, another experienced contributing engineer, was a long-time resident of Bay St. Louis and a Mississippi State University graduate, who headed up the Special Projects Division. Mooney, like many of his colleagues, had also worked with the team during the Apollo era. He had first worked for Boeing at Michoud on the S-IC program and then for North American Aviation (NAA) on the S-II test project.[68]

---

65. *Ibid.*; NASA-NSTL News Release, "NASA Extends CSC Technical Services Contract," 1 September 1979, SSCHRC. When Roscoe Nicholson made this statement in 1988 he was referring to the intense focus of test personnel on only matters pertaining to testing of engines, as compared to the administrative and management support personnel outside the Space Shuttle Test Complex.

66. Roberts, interview by Mack Herring, 30 March 1996.

67. Dick, interview.

68. Pat Mooney, interview by Mack Herring, 23 March 1996.

The NSTL Special Projects Division was capable of performing major modifications on test stands and performing any necessary mechanical-type work. Joel Estes, one the first test conductors for NAA on the S-II program, was in charge of the Technical Services Laboratory. Herman Watts was chief of the Field Services Branch in the laboratory, and Tom Weiss was chief of the laboratory's Electronic Calibration and Repair Unit.[69]

These engineers and technical managers directed the test support effort, providing the variety of services required to conduct a static firing. A portion of their responsibility involved providing the liquid hydrogen and liquid oxygen propellants, gaseous hydrogen, helium, and nitrogen, and high-pressure air to the test stands; running the high-pressure water facility; maintaining selected electronics and electrical systems on the test stands and in the test control centers (TCCs); providing communications systems; maintaining the audio and video systems in the test complex; furnishing the instrumentation calibration and repair in the laboratory; performing all types of logistics services; and handling minor and major modifications in the test complex. In truth, these elements provided all of the services needed to run shuttle engine tests. The failure of any one of these many technical support services could delay or stop a static firing. To say the least, all of these engineers and technicians were highly respected by the managers of the MSFC Resident Office and the rocket test teams of Rocketdyne and Rockwell.[70]

The success or failure of a rocket test was dependent on the test support personnel. In many cases, their dedication and hard work often went unnoticed outside of the test complex. Media coverage usually focused on test conductors, who were like the quarterbacks on a football team, or on the NASA and contract managers who acted as spokespersons for their programs.[71]

The people who really understood and recognized the support personnel for their work were people such as Admiral Richard Truly, NASA Administrator and astronaut; J.R. Thompson and his colleagues at the Headquarters and the MSFC; the many astronauts who often visited the NSTL and understandably

---

69. Director's Office, "Technical Support To Shuttle Test Program," 1977. For further information regarding the reactivation team, see *Marvin Lee "Marv" Carpenter's Personal Notes*, "Editorial Comments—Chapter 11," SSCHRC.

70. Mack Herring, NASA-NSTL News Release, "Shuttle Milestones Met at NSTL," 28 March 1980, SSCHRC; Nicholson, interview by Bolton, p. 21; Roberts, interview.

71. *Ibid.*; Mack Herring and Johnny Mann, *Way Station*, video history, 25 October 1991.

depended on the performance of the SSMEs; and Bob Bush, Boyce Mix, and the other members of the NASA-NSTL resident office.[72]

Lighting The Fire

The first launch of Space Shuttle *Columbia* at the Kennedy Space Center on 12 April 1981 was an awe-inspiring sight. Thousands of people on Florida's beaches gasped when they saw *Columbia's* engines ignite in a thunderous roar, sending the new space vehicle streaking skyward with a brilliant orange and white exhaust contrail pouring down hundreds of feet behind the bright white space vehicle.[73]

But for many at the Mississippi facility, the fire was lit nearly seven years earlier with the long and tedious testing of the SSMEs and the full-power, three-engine blasts of the MPTA at the NSTL. Most propulsion engineers agreed that the SSME was the most sophisticated and efficient rocket engine ever built. The high-pressure engine's fuel pump revved up from "0" to 47,000 rpm (revolutions per minute) in less than three seconds! Designed as a reusable engine for the Space Shuttle, the SSME was first static-fired at the NSTL on 19 May 1975. It is interesting to note that this first test of the SSME occurred approximately one year after the Mississippi Test Facility (MTF) was renamed the NSTL. In the two years after Hlass reported to the NSTL, Bob Bush, SSME Resident Manager, proclaimed the test program was going "full speed ahead" with engine tests occurring almost daily. On 22 September 1978, Bush observed, "We're in business now, and plans are to continue full speed ahead averaging six tests a week." At that time, the main engines had been fired for 23,000 seconds on the A-1 and A-2 test stands. Nearly all tests conducted on the A-1 stand in 1978 were 520 seconds, the duration required in flight. Shorter duration tests of 300 seconds were fired on the A-2 stand.[74]

---

72. Herring and Mann, *Way Station*, video history, 25 October 1991.

73. "*Columbia* Performs Flawlessly," *Lagniappe*, 20 April 1981, SSCHRC; NASA Mission Summaries, "Space Shuttle Mission Summary 1981–1983, STS-1 Mission," (Houston, TX: Johnson Space Center PMS-003, June 1986).

74. "Space Shuttle Main Engine," *Space Shuttle*, NASA George C. Marshall Space Flight Center, 1977; *Rocketdyne A-1 Test History: 19 May 1975 to Present* (Stennis, MS: Rocketdyne, 1976); NASA-NSTL News Release, 22 September 1978, SSCHRC.

By 1978, earlier problems encountered in the SSME test program R&D had been corrected. The long-awaited success of the shuttle engines provided an appropriate "bang" to help commemorate the 20th Anniversary of NASA, on 1 October 1978. But, to the engineers at the NSTL, the accelerated pace of the shuttle tests was just in time to qualify the engines for testing on the MPTA. The MPTA would bring together the three liquid-fueled engines, the huge external fuel tank, and a simulated orbiter structure, complete with an aft-section of the fuselage, to prove the Space Shuttle's main propulsion system before a launch could take place at the KSC.[75]

The MPTA program not only brought together the components of the simulated Orbiter Propulsion System, but also prompted managers to gather the best team of rocket test engineers and technicians ever assembled. Tom Baggette, one of the early S-II rocket stage test conductors in 1966 when the first Saturn V test rocket stage, the S-II-T, was test fired at the MTF and a test conductor on the Apollo spacecraft at the KSC, agreed with Pat Mooney that the MPT test program was the Stennis Space Center's "finest hour."[76]

The MPTA effort actually dated back to activation of the B-2 side of the big S-IC test stand used during the 1960s to static fire the Boeing-built Saturn V first stage. The MPT modification and activation program at the NSTL was started in May 1974 and at first followed the usual government construction process. But, when the time came to begin the complex and tedious process of installing the electronic instrumentation, fluid distribution system, and other technical systems, the NSTL team felt they could do the job better and more economically than outside contractors could. Harry Guin, representing Global Associates at the time, and Bob Bush, Manager of the MSFC Resident Office at the NSTL, with the help of their associates, put together a presentation illustrating that the NSTL could accomplish the task quicker and far cheaper than other contractors, such as Rockwell, who would be using the stand.[77]

Bush and Guin made their pitch to the MFSC Shuttle Project Office. The two men asked that Global be allowed to pull together the final activation of

---

75. "Twentieth Anniversary Edition," *Lagniappe*, 18 October 1978, SSCHRC; "MPTA Ready for Test Firing," *Lagniappe*, 17 March 1980, SSCHRC.
76. Tom Baggette, interview by Mack Herring, SSC, 24 March 1996; NASA National Space Transportation System, *Overview*, "SSME Flight Program," NASA Publications Series, September 1988; "Space Shuttle Main Engine," *Space Shuttle*, 1977; Mooney, interview.
77. "SSME Testing Pace Quickens," *Lagniappe*, 22 September 1978, SSCHRC; Mack Herring, NASA-NSTL News Release, 22 September 1978, SSCHRC; Baggette, interview; Mooney, interview.

the test position at the NSTL for the MPT. The MSFC shuttle managers questioned the presentation, telling Guin and Bush they did not believe the job could be done as cheaply as the NSTL engineers proposed. Guin, in typical dramatic fashion, rolled up his papers and charts and advised the MSFC personnel to "have at it" if they thought they could do the job cheaper. He then proceeded to walk out the door.[78]

Bush prevailed on Guin to stay, advised his MSFC associates to listen, and continued his pitch. As a primary result of the sales pitch, the NSTL support contractor proposal won the MSFC's confidence, and they landed the job. Actually, Guin knew he had an inside track because most of the personnel that would be doing the work were highly experienced veterans of the diverse NASA and contractor NSTL workforce. He also knew that his experienced workforce had the know-how and ability to cut corners and perform the task much cheaper than any outsider could that who did not know the people involved or the "ropes" at the Mississippi site. According to many, Doug McLauglin and his Global support group were the key to the fast-track and highly complicated project. In fact, a modest Pat Mooney, who succeeded McLaughlin as head of the support group, gave McLaughlin full credit for guiding the work. Among others who were instrumental in seeing the MPT test program to completion under budget and on time were Al Bush and Greg Ames, veteran engineers at the NSTL and employees of the Weaver Construction Company which did much of the activation work.[79]

The activation team finished their difficult job preparing the big test stand for its unique MPTA hardware just before the strange cargo was towed up the East Pearl River and arrived at the NSTL on 24 June 1977. The MPTA cargo came from California on the NASA covered-barge *Poseidon* to the Michoud Assembly Facility in New Orleans, Louisiana. Once at Michoud, the orbiter simulator was then transported to the NSTL on the river barge *Pearl River*, a 50-mile trip up the winding East Pearl River.[80]

The portion of the MPTA that traveled to the NSTL to be tested consisted of a 121-ton steel trusswork that resembled an oil derrick or a bridge assembly

---

78. Gilda Perkins, "NSTL Reactivated for Space Shuttle," *Slidell Daily Times*, 29 June 1977; Mooney interview; Dick, interview. For further information regarding Harry Guin's and Bob Bush's presentations, see *Marvin Lee "Marv" Carpenter's Personal Notes*, "Editorial Comments—Chapter 11," SSCHRC.

79. Mooney, interview; Carpenter, interview; Roberts, interview.

80. Lloyd Gray, "Space Shuttle Equipment 'Milestone' For NASA Lab," *The Sun-Herald*, 25 June 1977.

from a giant erector set. The structure was attached to a mockup of the aft section of an orbiter fuselage, which would house the main propulsion system of the craft. The weird-looking structure simulated the clean airplane-configuration of the 122-foot-long orbiter in weight, bulk, and structure, but certainly not in aesthetic appearance. The MPTA was assembled after placement in the B-2 position of the huge modified S-IC test stand, with the addition of a 154-foot-long external fuel tank, manufactured by the Martin Marietta Space Corporation at Michoud, and three Rocketdyne main engines previously tested at the NSTL.[81]

Harry Johnstone, the MSFC's MPTA resident manager, and Gerry Wilson, manager of the Rockwell Space Division Resident Office, met the barge. Johnstone commented that the arrival of the MPTA components was "the culmination of three years of hard work." He then teased Wilson, "And it arrived on time!" The serious-minded Wilson accepted the remark and said the funny-looking structure was like the "rear end of an airplane without the rudder and tail fins." The MPTA was installed in the B-2 position of the big test stand the next day, 25 June 1977, and preparations began to ready the MPTA for its critical firings before the first flight of the Space Shuttle *Columbia*.[82]

Bob Bush once commented that it was "the people more than anything" who were responsible for the success of the test programs. His words were never more true than in the case of the MPTA test program. Although each SSME would be thoroughly tested and certified, program managers believed it necessary to prove the Space Shuttle's entire propulsion system, complete with three hot-fired engines, before the vehicle's first launch. Another important part of the NSTL testing mission was to develop fueling and handling procedures for use by the KSC launch. This premise prompted the MSFC to put its best foot forward for the MPTA test series.[83]

As a result, the energetic and hard-driving Harry Johnstone was sent down from the MSFC to the NSTL in order to head up the MPTA program for NASA. Bush continued as manager of the MSFC "Shuttle Office" at the NSTL which conducted the MPTA and SSME testing. Bush, wearing two hats, later

---

81. "Shuttle One Step Closer To Reality," *The Daily Sentry-News*, 30 June 1977; "Simulator Arrives At NSTL," *Picayune Item*, 26 June 1977.
82. Gray, "Space Shuttle Equipment...," *The Sun-Herald*.
83. Robert "Bob" Bush, *SSC History Roundtable*, SSC video history series, SSC, 25 October 1991, SSCHRC.



The External Tank rises to its 154-foot height as it is placed into position in the B-2 Test Stand behind Main Propulsion Test (MPT) Manager Harry Johnstone. (SSC-78-016-9)

served as the MPTA manager after Johnstone left. Boyce Mix continued to manage the busy SSME program as the pace quickened with the developmental and certification programs. The MSFC Resident Office had strong support from the Quality Assurance Office's Doug Howard, a veteran of the old MTF, whose leadership was greatly appreciated by the contractors. Another welcome addition to the team was Bill Lindsey, who was an instrumentation and data expert. The support cast in the Resident Office had matured while accumulating valuable test experience during the SSME test program.[84]

Gerry Wilson "pulled some strings" to bring in the best test conductors he could find for the project, Tom Baggette and John Plowden. At the same time, however, another senior test conductor, Tom Lyddon, who was a veteran of the S-II program at the old MTF, was added to the team. Plowden

84. "Shuttle Test Crew–Veteran Team..." *Lagniappe*, 16 December 1979, SSCHRC; "Shuttle Tanking Test Successful," *Lagniappe*, 23 January 1978, SSCHRC.

was called to the NSTL from White Sands, New Mexico, where he was a facility systems engineer.[85]

The extremely high experience level of the MPTA team was exemplified by Marvin Lee "Marv" Carpenter. Carpenter was originally responsible for the MPTA electrical/instrumentation systems from 1982 until 1985, and he became one of the Rockwell resident managers. A graduate of Finley College in Kansas City, Missouri, Carpenter's experience in the aerospace world dated back to the beginning of America's space program. He worked on the Saturn V second-stage S-II test program with NAA, but also was involved in the Jupiter and Atlas missile programs.[86]

Carpenter designed and developed the hardware instrumentation systems used on all three NSTL test stands. He was responsible for the installation and operation of the systems on A-1 and A-2 and the modification and operation of the instrumentation on the MPTA. This special knowledge gave him and others who brought that kind of personal data to the MPT program a leg up on solving problems in the test complex. In fact, his colleagues said Carpenter knew the complex instrumentation and electronics systems "like the palm of his hand."[87]

Another seasoned test engineer who joined Rockwell Corporation's Mississippi team was Lewis B. "Lou" Nelson, a veteran NAA employee. He was one of the original 18 engineers sent to the site in 1965 to get ready for the S-II buildup who were housed in the old "firehouse." Nelson and Doug McLaughlin were roommates in college at the North Dakota School of Mines, went in different directions with the missile program, and were reunited at the NSTL. Other proven test engineers joining the MPTA team included Jim Green, Mike Polka, Charlie Knott, John Brokowski, Roe Crowder, and Karl Briesackor.[88]

The nucleus of the unusually well-qualified NSTL team was held together as a result of a decision made in the early 1970s by Doug Howard. In 1971, Howard decided to try and keep good engineers like Marv Carpenter, Doug McLaughlin, Curtis Campbell, Steve Dick, Joe Brown, Joel Estes, and Pat

85. "Shuttle Test Crew Veteran Team...," *Lagniappe*, 16 December 1977, SSCHRC; "MPTA Test Conductor Baggette Describes Role in Team Support," *Lagniappe*, 21 March 1980, SSCHRC; Carpenter interview.
86. Carpenter, interview.
87. *Ibid.*
88. Nelson, interview.

Mooney on the base "in reserve" for future programs. In addition, as a result of Howard's groundwork, more than 50 of the best engineers remained onsite after the Apollo testing program. Jerry Hlass's emphasis on building a strong support structure for the Space Shuttle test program and for other possible future programs obviously perpetuated the earlier Howard plan. In fact, Hlass's determination to strengthen the test support effort took the team to another level, once he secured the appropriate funding and agreements to gain NASA Headquarters and the MSFC recognition.[89]

By spring 1978, with the "right" people on board, the NSTL team focused efforts during the next several months toward getting the MPTA prepared for the first series of tests. Engineers and technicians working on the MPTA program remember the long, hard hours of work as they proceeded through a tanking test, simulated countdowns, and endlessly checked the electrical and mechanical systems. Johnstone, a bundle of energy, was all over the big test stand boosting worker morale with his well-known expression, "That ain't no hill for a stepper!"[90]

The MPTA test team passed the Firing Readiness Review held by NASA's Review Board at the NSTL 6-7 March 1978. The Review brought a number of space notables to the site. In attendance were the members of NASA's Space Transportation Systems organization, including John Yardley, Associate Administrator for Space Transportation Systems; Christopher C. Kraft, JSC Director; Dr. William R. Lucas, MSFC Director; Lee R. Scherer, KSC Director, Dr. Walter C. Williams, NASA Chief Engineer; and Dr. Mike Malkin, Director, Space Shuttle Program. Other important officials involved in the Space Shuttle program from NASA Headquarters, the JSC, the MSFC, Rockwell, Rocketdyne and Martin Marietta also came. Gerry Wilson compared the review to a "jury;" although the MPTA group was not literally on trial, their work and status were.[91]

The review began with an examination of the design and certification of hardware for each element of the test article, orbiter, external tank, and main engine. The members then reviewed the readiness of the prefiring test program

---

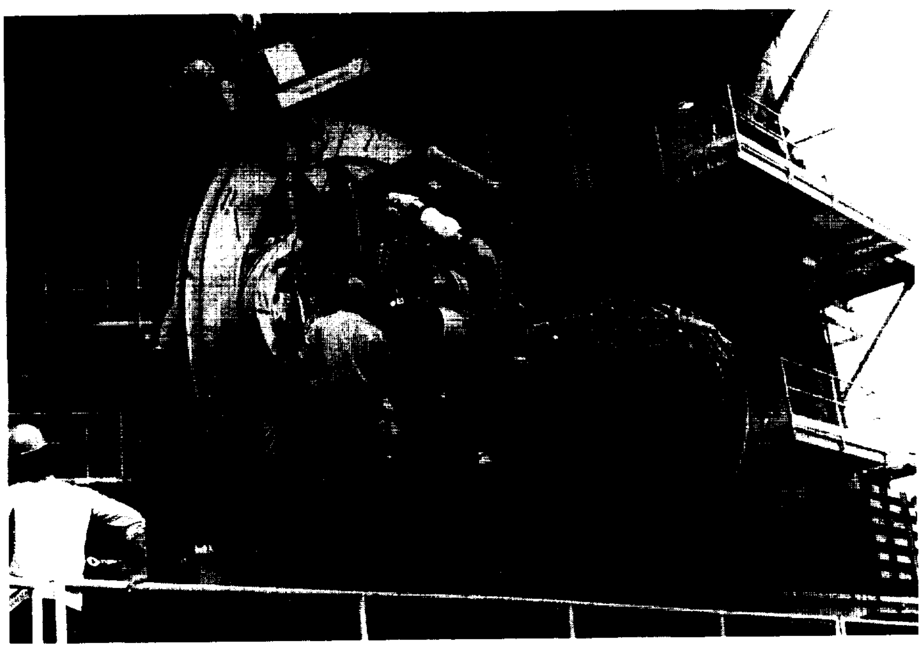
89. Carpenter, interview; Roberts, interview.

90. "Shuttle Tanking Test Successful," *Lagniappe*, 16 December 1977, SSCHRC. Harry Johnstone was a leader and an inspiration for the entire MPTA test crew. Technicians have said Johnstone would look over their shoulder during difficult tasks and say, "That ain't no hill for a stepper!"

91. "MPTA Ready for Test Firing," *Lagniappe*, 17 March 1978, SSCHRC.

and, finally, the status of action item closure. At the end of the two-day session, the review board gave the team a "thumbs up," but left 12 action items to clear up before the first firing. The gathering of NASA's space transportation "first team" at the NSTL resulted in more than just an approval for the important MPTA test. The bringing together of Agency propulsion and flight experts also showcased the capabilities of the installation and the competence of the test and support personnel. Hlass and his organization began to build on these factors as they continued to gain further recognition in the propulsion world.[92]

Smaller reviews were also held as the NSTL testing team proceeded toward the first MPTA test, because everyone at the Mississippi facility and at the Agency were anxious to prove the critical propulsion system. The first test came at 11:34 a.m. on 21 April 1978. Although the "hot" part of the test was only 1.90 seconds, the puff of smoke signaled the beginning. A number of the



Technicians install Space Shuttle flight engine 2007 into the A-1 test stand 13 April 1979. (SSC-79-116-7)

92. "MPTA Achieves Requirement," *Lagniappe*, 20 February 1981, SSCHRC.

NSTL employees watched the event in new covered bleachers installed in a parking lot 5,000 feet from the big stand where the three shuttle engines were fired. The shuttle viewing area was far more plush than the old Saturn V area, which was located on an oyster-shell road, and had uncovered, rickety, surplus grandstands similar to the ones on high-school football fields. As a result, during the Saturn V testing era, many spectators got wet during tests, due to rain or test exhaust. Later, MPTA firings for longer durations attracted hundreds of employees, their families, local citizens, and members of the media.[93]

With a dozen tests successfully completed at the NSTL by February 1981, more than one hour of firing time was accumulated on the test version of the Space Shuttle's main propulsion system. During that time, the system achieved all certification requirements for the first launch, as well as other objectives for later missions. Six of the 12 tests successfully conducted at the NSTL were programmed to meet or exceed the 520-second duration necessary to put a shuttle into orbit. The final test of the system, which took place 17 January 1981, was deemed a "complete success" by Bob Bush.[94]

The 629-second final firing was the longest test conducted on the MPTA and the first full-duration static firing using flight-type nozzles on the three main engines. Previous tests used a "stub nozzle." During the 17 January test, the engines were fired at 100 percent of rated power level for 239 seconds, at which time one engine was shut down. The early cutoff simulated the in-flight shutdown of an engine and an aborted mission in which the astronauts would return the orbiter to its launch site. This was the "Return To Launch Site" (RTLS) maneuver. Following the test, John Yardley, Associate Administrator for Space Transportation Systems, said the final test "demonstrated that the people down here [at the NSTL] really know how to make this thing work." Yardley added, "They've done a magnificent job, and I want to congratulate them."[95]

Yardley's words were lagniappe to the people who conducted the highly successful MPTA test program and to the experienced support team that backed them up. All told, 18 MPTA firings were conducted at the NSTL between 21 April 1978 and 17 January 1981. The people of the NSTL team,

---

93. SSC Test and Engineering Directorate, "MPTA Test History," 3 January 1995.
94. *Ibid.*; "Final MPTA Test Completed," *Lagniappe*, January–February 1981, SSCHRC.
95. *Ibid.*

"in its finest hour," had proven the Space Shuttle's Main Propulsion system ready for flight.[96]

Just before the launch of the Space Shuttle *Columbia*, a confident Boyce Mix, SSME engine manager, predicted, "It's going to work." The calm Mix, a veteran of testing the giant S-IC Saturn V booster in the 1960s, mused, "We've satisfied all requirements for the first launch, and unless something unexpected comes up, we've satisfied all requirements for the following five launches." Mix, in a philosophical, retrospective analysis of the NSTL test program, stated, "I think the location here in southern Mississippi has helped us be more productive than we could have been in a more industrial area. We've got technicians, engineers, and support personnel who are very dedicated. If a job has to be done, they go out and do it. We've got a quality of employees far and above many other areas of the country."[97]

Mix attributed the expertise of the workers to a "certain pride" among the team members. "People will say someday, 'My father worked on the shuttle engine testing program,' and [the members of the test team] are proud to be a part of something this big. It's not just another job to these people," Mix mused, "It's their life."[98]

The kind of dedication and experience that Mix spoke of contributed to the successful launch of Space Shuttle *Columbia* from the KSC at 7:00 a.m. EST on 12 April 1981. The awesome, brute power shook buildings miles away at Cocoa Beach and was heard as far away as Orlando as it shot skyward on its maiden voyage. The hybrid mix of solid and liquid propellants had not been seen before in the skies over the Florida launch site.[99]

Robert E. Herring, a space buff from St. Augustine, Florida, was among the approximately one million people viewing the lift-off at the launch site and along the beaches at Cape Canaveral. According to Herring, there was a "Wham! A buff of thunder," at which point he thought, "shake them up *Columbia*!" Next, he saw "the big fire [of brilliant red that was] twice as long as the rocket ship." He reported that "the vibration [caused his] telescope on

---

96. *Ibid.*

97. Douglas Nany, "NSTL's Future Rosy if Shuttle Successful," *Picayune Item*, 17 February 1981.

98. *Ibid.*

99. NASA-JSC, "Information Summaries, U.S. Manned Space-Flight Log, PMS-020 (JSC) August 1986; NASA-JSC Information Summaries, Space Shuttle Mission Summary 1981–1983, STS Missions 1–9" (Houston, TX: Johnson Space Center PMS-003, June 1986); "*Columbia* Performs Flawlessly," *Lagniappe*, 20 April 1981, SSCHRC.

the hood of the car to shake and some nearby lady [to be frozen in wonder]." Herring later remembered thinking, as the cheers of the crowd began to die down, "*Columbia*, you shook the Earth, baby!"[100]

The flight of *Columbia* marked the first use of solid propellants to launch a spacecraft with people aboard and the first time ever that astronauts were sent aloft on the brand new space vehicle. With all of the "firsts," *Columbia* ushered in a new era of spaceflight. NASA now had a launch vehicle with a stable reusable rocket that gave explorers routine access to space.[101]

Astronauts John Young and Robert Crippen guided the *Columbia* to a perfect touchdown at Edwards Air Force Base in California after a 54-hour, 21-minute, 36-orbit "flawless shakedown" flight. Via worldwide television, millions watched the shuttle landing. The general populace, and the media for the most part, focused their spaceflight attention on the astronauts, their launchings, and landings.[102]

Most of the time support crews, who work out of the view of the TV cameras, go unnoticed by the general public. Such was the case of the NSTL test team and their support crews. But the people who knew of their contributions to flight were full of accolades after the mission. Without the perfect performance of the three main engines tested at the NSTL, the shuttle would have never made it into orbit. Boyce Mix, who literally lived with the engines for the previous eight years, stated, in an unusual display of excited emotion, "It was just super!" He proudly said, "The engines performed as planned. It was really remarkable!" Bob Bush observed that the maiden flight of the Space Shuttle gave him a "great sense of accomplishment," to know that "[we had] contributed in even a small part" to the success of the shuttle mission.[103]

A very proud Jerry Hlass, who traveled to the KSC to witness the launch with a number of NSTL employees, their families, and community friends, made sure that his team got part of the credit for the Space Shuttle's success. He said, "It is a tribute to our NASA and contractor personnel at the NSTL who worked very hard to do the developmental testing and certification of

---

100. Robert E. Herring, Commentary, "A Postscript on *Columbia*," *Lagniappe*, 22 May 1981, SSCHRC.

101. Howard Benedict, *NASA: The Journey Continues* (Houston, TX: Pioneer Publications, Inc. 1981), pp. 64–67; "*Columbia* Performs Flawlessly," *Lagniappe*, 20 April 1981, SSCHRC.

102. Henry C. Dethloff, *Suddenly Tomorrow Came...A History Of The Johnson Space Center* (Washington, DC: NASA SP-4307, 1993), p. 271.

103. "*Columbia* Special Edition," *Lagniappe*, 15 April 1986, SSCHRC.

these engines. History was made with this successful flight and landing [of] *Columbia*, and we can all remember, with pride, our contribution."[104]

The "pride" of which Boyce Mix spoke before the launch was underscored by President Ronald Reagan in his remarks after the first shuttle flight. The "old horse soldier," who, some worried, might not be supportive of the space program, said in a statement following the launch: "Once again we feel the surge of pride that comes from knowing we are the first and we are best, and we are so because we are free."[105]

Of all the "thank you's" and accolades bestowed on the hundreds of employees at the NSTL, both inside and outside of the blockhouse, perhaps the most appreciated comments came from astronauts John Young and Robert Crippen. Young and Crippen chose the NSTL as their first postflight destination, paying a visit to thank the dedicated personnel for their contribution to the first shuttle flight. Young and Crippen, who had visited the site before the mission for a briefing and to witness a static firing from atop the A-1, A-2 Test Control Center, visited the NSTL on 8 May 1981, just 24 days after the flight of *Columbia*. Speaking to a jam-packed house at the Central Control Building, Crippen said, "You can't do this kind of program without running an extensive test program. The effort that you contributed made it possible for us to sit back and ride. We couldn't even make it look hard!"[106]

The wiley veteran Young went after the hearts of the NSTL workers when he said, "I am really proud to have been associated with you people because this vehicle is built for the future—the '80s and '90s." The NSTL employees in the audience, people in coats and ties, slack suits, and overalls, stood and applauded. Their pride and hard work continued to "support the shuttle" through the 1980s and 1990s. Throughout all those years, not one mission failed due to the engines developed and tested at the NSTL.[107]

---

104. *Ibid.*

105. *Ibid.*; Roger D. Launius, *NASA: A History Of The U.S. Civil Space Program* (Malabar, Fl.: Krieger Publishing Company, 1994), pp. 112–113.

106. "*Columbia* Special Edition," *Lagniappe*, 15 April 1986, SSCHRC.

107. "Young, Crippen Commend Employees at NSTL," *Lagniappe*, 22 May 1981, SSCHRC

CHAPTER 12

Of Triumph and Tragedy

The Best of Times

The early success of America's Space Shuttle program ushered in an era that was perhaps the "best of times and worst of times" for a resurgent NASA and most especially for the growing National Space Technology Laboratories (NSTL) in Hancock County, Mississippi. During the first half of the 1980s, NASA regained confidence and again savored the national reputation the Agency enjoyed when the *Eagle* soared and landed on the Moon in 1969. Indeed, NASA seemed to have the world, and even the heavens, by the tail and was not about to let go.[1]

Riding on the crest of success and popularity, Jerry Hlass's maturing NSTL team gained special recognition as NASA's newest and toughest "can do" organization. Most of Hlass's early goals were achieved, and the morale

1. Charles Dickens, *A Tale of Two Cities* (New York: Walter J. Black, Inc., 1969), p. 1; Lovell Beaulieu, "NASA Rocketing Into the '80s," *The New Orleans (LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 20 January 1980; Roger D. Launius, *NASA: A History of the U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Company, 1994), p. 112; Henry C. Dethloff, *Suddenly Tomorrow Came. . .A History Of The Johnson Space Center*, (Washington, DC: National Aeronautics And Space Administration SP-4307, 1993), p. 285; William B. Breuer, *Race to the Moon, America's Duel with the Soviets*, (Westport, CT: Praeger Publishers, 1993), p. 196.

of the site employees and community neighbors climbed as high as the white cypresses rising skyward from the Honey Island Swamp.[2]

The NSTL's Earth Resources Laboratory (ERL) gained national and international prominence due to pioneering scientific achievements in remote sensing and space technology applications. The onsite Space Shuttle support program was proving superiority with every shuttle mission.[3]

Those were the days! It seemed like the good times would never end for NASA. The Space Shuttle became a national symbol, its butterfly likeness placed on T-shirts, lapel pens, and even on milk cartons. Americans began to believe that civilians—school teachers and television commentators—should take a ride on the shuttle.[4]

Alas! Even the best of times come to an end. The awful Space Shuttle *Challenger* tragedy dashed the spirits of a nation—crushing NASA's regained confidence when the spacecraft came crashing down in the blue Atlantic waters off Cape Canaveral. Sadly, all seven crew members perished, among them a space-struck social studies teacher from New Hampshire.[5]

Gloom fell heavily as the grim news spread. Millions were stunned, frozen at their television sets on that cold January day in 1986. In south Mississippi, the NSTL employees and community supporters were devastated by the initial speculation that the accident could have been caused by a failed Space Shuttle Main Engine (SSME) tested at the NSTL. Perhaps NASA's greatest triumph began on that frigid Florida morning, for from the *Challenger's* ashes there arose a NASA courage from the very guts of thousands of comrades across the nation who refused to let this beloved crew die in vain. Among that number were the men and women at the NSTL, who, following the tragedy, "tested the way" as NASA returned to space.[6]

---

2. "NSTL Receives Good Notices in State, Area Press Coverage," *Lagniappe*, 17 August 1979, Stennis Space Center Historical Records Collection (henceforth referred to as the SSCHRC); "Accomplishments Receive Extensive Press Coverage," *Lagniappe*, 13 February 1981, SSCHRC; "NASA Employees Recognized for Outstanding Achievements," *Lagniappe*, 25 September 1980, SSCHRC.
3. *Ibid.*
4. "Journalists to Fly on Space Shuttle," *Lagniappe*, 20 November 1985, SSCHRC; Howard Benedict, *The Journey Continues* (Houston: Pioneer Publications, Inc., 1989), pp. 101–102.
5. Benedict, *The Journey Continues*, pp. 104-106; William P. Rogers et al., *Report of the Presidential Commission on the Space Shuttle Accident* (Washington, DC: U.S. Government Printing Office, 1986), pp. 19–21.
6. "NSTL Joins Nation in Tribute to Challenger Crew," *Lagniappe*, 20 February 1986, SSCHRC; "Jerry Hlass Speaks to NASA, Contractor Teams," *Lagniappe*, 21 April 1986, SSCHRC.

The Senator Calls

By 1981, the years of hard work and political forays in the nation's capital began to pay off for the hard-working Senator Stennis and his diligent staff members. The Mississippi installation with which Stennis was so closely associated achieved the "full utilization" the Senator wanted so badly. The Naval Oceanographic Office completed its relocation move to the NSTL. The Mississippi Army Ammunition Plant was under construction at the NSTL and would soon be a productive addition to the nation's defense. And the Space Shuttle program that Senator Stennis "picked up off the cutting room floors" of Congress was providing NASA with routine access to space.[7]

Senator John C. Stennis never forgot his promises in 1961 to the original landowners at Logtown. By 1981, he had worked tirelessly for two decades to see the $350 million testing facility investment by the nation's taxpayers reach "full utilization." The steadfast statesman from Kemper County, Mississippi, was there for his people in south Mississippi and for their "space age" NSTL neighbors at every turn, whether the turn was for better or worse.[8]

When the NSTL all but fell prey to rampant kudzu vines during the decline of the Apollo program in the early 1970s, Stennis helped guide potential tenants, such as environmental agencies, to the site. Again, when NASA was about to lose its Space Shuttle program in 1972, Stennis rallied his congressional colleagues to support the "new reusable" space vehicle. The Senator then helped relocate the Navy oceanographic program from the Washington, D.C., area to its new NSTL home in 1975. Stennis also helped NASA Headquarters find a way to avoid moving the ERL to Houston in 1976. John Stennis was also there to provide the push to pick up the huge Army munitions manufacturing plant off the planning boards and place it on the site in 1978.[9]

---

7. "Army Welcomed to NSTL Family," *Lagniappe*, 23 January 1978, SSCHRC; "Senator Stennis Greatly Impressed During October Visit to NSTL," *Lagnaippe*, 3 November 1978, SSCHRC; Mack Herring, "U.S. Senator John C. Stennis: He Was A Giant In Every Way," *Lagniappe*, 25 May 1995, SSCHRC; "Stennis Tribute Dinner, June 23, 1988," Congressional Record, 100th Congress, vol. 134, No. 105, Senate, 13 July 1988.
8. "Salute to Senator Stennis," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as the *Sea Coast Echo*), 30 April 1995.
9. *Ibid.*; Nan Patton Ehrbright, "Stennis's Life, Work Saluted," *The (Biloxi/Gulfport, MS) Sun Herald* (henceforth referred to as *The Sun Herald*), 4 August 1988. It is interesting to note that kudzu vines, originally grown in Japan, are found throughout the South and choke all other vegetation they come in contact with.

Even so, the Senator did not save the south Mississippi facility by himself. He joined forces with Jerry Hlass, and together they worked many long hours to save the facility. The foundation Hlass laid when he arrived proved strong enough to build on, and when Senator Stennis paid visits to inspect the booming NSTL, he saw progress on every front. In fact, the proud Senator was frequently called upon to join Hlass and the NSTL employees for ground-breaking ceremonies for new facilities, for the dedication of new buildings, and to view the awesome power of the SSMEs during testing. Rarely had a legislator had the opportunity to see as many fruits of his labor as did Senator Stennis.[10]

Senator Stennis joined a host of Washington dignitaries and NSTL Manager Hlass to welcome the Army Ammunition Plant to the NSTL complex during ground-breaking ceremonies on 10 January 1978. Among the luminaries present were U.S. Representatives Trent Lott and G.V. "Sonny" Montgomery; Deputy Secretary of Defense Charles W. Duncan, Jr.; Secretary of the Navy W. Graham Clator, Jr.; Rear Admiral J. Edward Snyder, Jr.; and NASA Deputy Administrator Alan M. Lovelace. More than 1,500 people from surrounding areas joined the NSTL employees in celebrating the beginning of the huge, $398 million construction of the plant.[11]

Stennis referred to the 1961 Logtown meeting in his address at the Army Ammunition Plant ground-breaking ceremony, just as he did in most of his speeches at the NSTL. "I have never forgotten the promises [I made] that day in Logtown," he said. "I have kept foremost in my mind [the fact] that the people of Hancock County willingly allowed over 40 percent of the land area of [their] county to become a federal installation. In return, the federal government assured the people of Hancock County and Mississippi that the facility would be used." For all of the high-ranking NASA, Army, and Navy officials present, Stennis, chairman of the Armed Services Committee, re-emphasized his Logtown promises when he said: "As long as I have anything to do with it, that promise of the federal government can and will be met!"[12]

---

10. "John C. Stennis Space Center," *Lagniappe*, 20 May 1986, SSCHRC. See chapters 9 and 10 of this book for a good discussion of the Navy's relocation from Suitland, Maryland, to the NSTL.
11. "Salute to Senator Stennis," *The Sea Coast Echo*, 30 April 1995.
12. "Army Welcomed to NSTL Facility," *Lagniappe*, 23 January 1978, SSCHRC; "Watch for Speculators," *Rural Electric News*, December 1961.

Stennis then complimented the unique arrangement of federal agencies working together at the NSTL when he said, "Today this facility exists as a national model of federal agency coordination and cooperation." Stennis also stressed that the NSTL facility served as a prime example of how diverse group needs would be met at the "lowest possible cost to the American taxpayer." U.S. Representative Trent Lott strongly endorsed the NSTL when he said the installation had made great strides as a "center of excellence."[13]

Hlass hosted Stennis and Lott several times during the next few years at events recognizing the installation's progress, but probably none was more rewarding than Stennis's visit on 19 October 1978. During the visit, the Senator was ushered into the Space Shuttle Test Control Center (TCC) for the last few minutes of an SSME static firing countdown. Stennis talked freely with engineers and technicians who were not busy with the critical work of the countdown. With a serious expression on his face, Stennis listened intently to a briefing conducted by Space Shuttle Resident Manager Bob Bush and Rocketdyne Test Operations Manager Bill Costas. At T-6 minutes, Bush and Costas escorted Stennis up a steel staircase to the top of the blockhouse to view the firing. During the 100-second run, Stennis stared in awe as the powerful engine roared, pumping huge staccato puffs of steam into the south Mississippi sky. When the firing ended with its closing "whump," Stennis dispensed with his usual senatorial decorum and surprised the NASA and Rocketdyne personnel by clapping his hands and actually dancing a little soft-shoe "jig."[14]

Still on an emotional high, Stennis observed, "the facility is back in business as far as the space program is concerned and has taken on the role of serving as a home for the military services and others." The glowing Stennis also commented, "there is a foundation here from which NASA programs and other agency programs can grow."[15]

Stennis then paused to pay Jerry Hlass a well-earned compliment and offer a strong vote of confidence that Hlass and his re-invigorated NASA team were on the right track. "I am greatly impressed with Jerry Hlass's management of the installation and the talents and spirits of the people [here] are truly

13. "Army Welcomed..." *Lagniappe*.
14. "Stennis Pleased with NSTL Progress," *Lagniappe*, 23 January 1978, SSCHRC.
15. *Ibid.*



U.S. Sen. John C. Stennis claps and dances a soft-shoe "jig" atop the A-1/A-2 Test Control Center following a successful test of a Space Shuttle Main Engine. Pictured at the unusual event are, from left, Jerry Hlass, manager of the National Space Technology Laboratories; Stennis; Howard Griggs, resident manager of Rocketdyne; and NASA's Robert "Bob" Bush. (SSC-78-459-33)

great," Stennis praised in his expansive mood. Again Stennis repeated his support of the southwest Mississippi facility by simply stating that the NSTL "will continue to have my solid support."[16]

On another visit on 5 April 1981, Stennis returned to NSTL with the express purpose of showing Secretary of the Navy John H. Lehman, Jr., the Navy elements that relocated and consolidated at the Hancock County site. At that time, a combined total of more than 1,250 people were employed as members of either the Commander's staff, Naval Oceanography Command staff, Naval Oceanographic Office, and the Naval Ocean Research and Development Activity. The entire population of the site was approximately 3,400—a far cry from a previous low of about 900 in the early 1970s. During his visit, Stennis stated that budget cuts proposed by the Reagan Administration would have little effect on the work at the NSTL. "What you are doing here is too important," the confident Stennis remarked.[17]

The brisk activity at the NSTL represented the kind of growth and productivity that the Senator originally envisioned for the facility. Stennis returned triumphantly on 31 March 1983 to dedicate the Mississippi Army

16. *Ibid.*

17. Douglas Nanney, "Stennis, Navy Secretary Tour NSTL," *Picayune (MS) Item* (henceforth referred to as the *Picayune Item*), 5 April 1981; "Stennis, Navy Secretary, Visits Site," *Lagniappe*, April 1981, SSCHRC.

Ammunition Plant. Built to manufacture the improved 155mm M483A1 projectile, the final cost of the plant reached $479 million. The monstrous plant, located on 7,000 acres in the northern portion of the site, meant approximately 1,300 jobs for Mississippians. Stennis appreciated that most workers were local people, trained by Pearl River Community College and the Army. At the dedication, the Senator praised the people for their support of the NSTL and called on his fellow citizens to "do a better job" of finding talented young people to "understand hard science, hard math, and hard languages."[18]

Although Jerry Hlass had come to know Senator Stennis during the Apollo days when Hlass (at NASA Headquarters) provided Stennis's office with progress reports of the ongoing construction, the two men came to know and respect each other even more during the 1980s. Stennis knew the NSTL was in good hands with Hlass. Hlass, on the other hand, knew his work was appreciated and the NSTL had support from one of the most influential members of the Congress, a situation that was good for the facility, and also for the Agency in general. As a result, NASA leaders often called upon Hlass to intercede with the Senator for help on space projects that actually had very little to do with the NSTL.[19]

A New Look For The NSTL

The transformation of the NSTL during the Hlass years pleased many people. The NSTL employees, members of the local communities, and NASA Headquarters officials all found the "renasafication" of the site to their liking. For the first time, site employees began receiving recognition for their work, and nearby communities began to reap additional rewards from years of supporting the installation. Students in southern Mississippi and Louisiana were being treated to educational benefits by NASA giving them a "leg up" on children in other parts of the country. The decade of the 1980s was truly a time of growth and prosperity for Jerry Hlass and his NSTL team.[20]

---

18. "Army Plant Dedicated," *Lagniappe*, 17 April 1983, SSCHRC.
19. Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996; "Salute to Senator Stennis," *The Sea Coast Echo*, 30 April 1995.
20. Mack Herring, "For NSTL. . . The Best of Times," *Lagniappe*, 25 January 1980, SSCHRC; "Lovelace Forecasts Positive Future for NASA, NSTL," *Lagniappe*, 25 January 1980, SSCHRC.

The first NASA "Honor Awards Ceremony" at the NSTL was held in the Gainesville Room in Building 1100 after Jerry Hlass's arrival in 1978. The large conference room only held about 75 people, so Hlass later moved the annual awards ceremony to the auditorium in the Central Control Building (Bldg. 1200), which seats about 270 people. Hlass felt the ceremony had to be conducted before the employees' colleagues and fellow workers to achieve maximum morale building. All NASA employees were strongly encouraged to attend by their supervisors, and the contractor employees were invited by their managers for any special recognitions.[21]

The awards were given for contributions by NSTL employees to many diverse endeavors, e.g., Space Shuttle program; joint United States-Mexican program to control illicit drugs through application of remote sensing technology; Regional Applications Program (RAP); use of vascular aquatic plants for waste treatment; and development of specialized software for processing imagery data. Hlass was presented the first of two executive awards signed by the President. Dr. Robert A. Frosch, NASA Administrator, presented Hlass with the "President's Rank of Meritorious Executive" at ceremonies at NASA Headquarters on 10 September 1980. Hlass, on receipt of the award, said his accomplishments would not have been possible without the support of the "NSTL team."[22]

Members of the NSTL family were not the only people who benefitted from the new-found prosperity. In 1981, the total community economic impact of the NSTL in a 50-mile radius from the site reached approximately $150 million per year. The NSTL employees contributed more than $100,000 to Gulf Coast charities in 1981, a figure that continued to rise each year with the growth of the facility.[23]

A *Picayune (MS) Item* editorial noted that during the booming years of the 1980s, the NSTL and the city of Picayune came together to form a "good marriage," one that was naturally beneficial. The newspaper projected an even brighter future. The 1980 editorial represented the positive attitude in nearby

---

21. "NASA Employees Recognized for Outstanding Achievements," *Lagniappe*, 25 September 1980, SSCHRC; Lisa Monti, NASA-NSTL News Release, "NSTL Conducts Annual Awards Ceremony," 25 October 1984, SSCHRC; Lisa Monti, NASA-NSTL News Release, "NSTL Employees Receive Major Awards," 22 October 1985, SSCHRC; NASA-NSTL News Release, 10 September 1980, SSCHRC.
22. "Presidential Award Presented To Hlass," *Lagniappe*, 25 September 1980, SSCHRC.
23. "Installation Hosts Tourism Committee," *Lagniappe*, 17 August 1981, SSCHRC.

communities as a result of the new image projected by Hlass and his vibrant NSTL team.[24]

Perhaps U.S. Representative Trent Lott best summarized the community contributions made by the NSTL during one of his frequent visits on 10 April 1982. The supportive congressman told those attending an Americanism Rally in Picayune that development of "the [multiagency] facility had worked beyond my wildest dreams." Lott, House Republican Whip, said, "I have to tell you, [the] NSTL is a tremendous asset to this area and to our entire state."[25]

Jerry Hlass must receive much of the credit for the positive response the facility received during this period, primarily because of his "good will" policy. Hlass extended his good will policy into the public arena by supporting education, youth, and visitor information programs. He assisted Mack Herring, public affairs officer, in starting a sitewide newsletter for the employees. The *Lagniappe* was first issued in November 1977 and quickly became one of the better newsletters in the entire NASA family. Area media representatives also enjoyed the *Lagniappe* because it helped them to keep up with the news at the NSTL.[26]

In 1979, Hlass supported a modest, educational outreach program that provided an aerospace education lecturer for elementary and secondary schools in the Gulf Coast area. This program was expanded with the addition of an aerospace lecturer and a "rolling store" teacher resource vehicle, which traveled throughout Mississippi dispensing space-oriented materials for teachers to use in their classrooms. The rolling store was a converted milk truck, and although slow, it was effective with its wide body and walk-in rear door.[27]

The NSTL had operated a public visitors program since 1965, but lacked the personnel and resources to attract and accommodate large numbers of people. In 1966, von Braun turned the Central Control Building into a colorful museum. He sent his best designers and artists from Huntsville to give the lobby, 90-foot

---

24. Ed Darling, editorial, "NSTL-Picayune: A Good Marriage," *Picayune Item*, 29 April 1980.

25. "Lott Praises NSTL," *Picayune Item*, 2 May 1982; "Representative Lott Praises NSTL, Pledges Continued Support," *Lagniappe*, 19 April 1982, SSCHRC.

26. NASA-NSTL News Release, "NSTL, Charles B. Murphy School Conduct Cooperative Education Program," 1 February 1984, SSCHRC; *Lagniappe*, 11 November 1977 (first issue), SSCHRC. The *Lagniappe* was the first sitewide newsletter published at the NSTL.

27. "NASA Establishes Education Outreach Program," *The Sea Coast Echo*, 16 April 1979; NASA-NSTL News Release, "NSTL to Host Regional Mathcounts Competition," 13 February 1984, SSCHRC; NASA-NSTL News Release, "Teachers Workshop," 7 July 1980, SSCHRC.

observation tower, and grounds a "space age" look. Unfortunately, without continued financial support, this initial work deteriorated.[28]

Hlass supported a small array of exhibits in the Building 1200 museum and allowed additional funds to be spent on a visitors program. In November 1980, the improved Visitors' Center opened, with Terry Malone, a retired NASA employee, named to operate a limited program for public visitors.[29]

With the announcement that the 1984 World's Fair would be held in New Orleans, NASA Headquarters supported developing a first-class NSTL Visitors Center. This was a direct result of the Agency's desire to showcase NASA programs, and rightly so, as NASA officials expected many World's Fair visitors to stop at the Mississippi facility on their way to New Orleans.[30]

Hlass called in favors from friends at Headquarters and Kennedy Space Center (KSC) in Florida to obtain funding for the project. Most of the money—to renovate Building 1200, enlarge the museum, and develop a thematic exhibit portraying space program history and NSTL activities—came from the profits of KSC's Visitors Center. The Johnson Space Center (JSC) helped by furnishing contractor exhibit specialists and artwork through a cooperative venture.[31]

The NSTL Visitors Center, with a theme of "Space-Oceans-Earth," was opened one day before the grand opening of the New Orleans World's Fair on May 12, 1984. Mississippi Congressman Trent Lott was principal speaker, and Astronaut Terry Hart, who had just repaired a satellite in space, joined the NSTL employees at the dedication. Highly successful, 175,000 people called on the Visitors Center the first year, with numbers eventually leveling off to about 100,000 people per year.[32]

In 1985, in answer to President Ronald Reagan's (1911–) "Operation Liftoff" call to help America's young people learn more about science and math, Teacher Resource Centers were established at all NASA field centers and installations. Hlass organized another interdisciplinary team and built one

---

28. NASA-NSTL News Release, "Expanded Visitors Center Program Available at NSTL," 14 November 1980, SSCHRC; NASA-NSTL News Release, "NASA-NSTL Visitors Center Enhancement Progresses," 24 January 1984, SSCHRC.
29. Hlass, interview.
30. *Ibid.*; "Chamber Group Plans for '84 World's Fair," *Lagniappe*, 18 April 1982, SSCHRC.
31. *Ibid.*
32. Hlass, interview; Mack Herring, NASA-NSTL News Release, "NSTL to Dedicate Visitors Center," 4 May 1984, SSCHRC; Edith Bierhorst Back, "NSTL Visitors Center is Dedicated," *The Mississippi Gulf Coast Sun/Daily Herald*, 12 May 1984; "'Good Times Roll' as Fair Gates Open," *The Times-Picayune*, 13 May 1984.

of NASA's best teacher centers, located in the Visitors Center basement. In addition to the outreach education and visitor programs, the NSTL ventured into other youth-oriented endeavors and achieved recognition from NASA Headquarters and national scouting organizations. In 1980, Hlass agreed to host a "Summer Apprenticeship Program" for area high school students selected on the basis of their academic backgrounds, personal interviews, and interests in math and science programs. The selected students were placed in different NSTL laboratories and work areas, where they would gain on-the-job experience. A NASA mentor was assigned to assist each student. Curtis Graves, director of Education Programs at NASA Headquarters, commented, after the first apprenticeship program was successfully completed, that the NSTL had the "best coordinated and conducted program" in all of NASA.[33]

In addition to the apprenticeship program, the NSTL organized one of the largest Explorer Scout Posts in the nation, with a charter membership of 67 youths from nearby communities. Called "Space-Oceans-Earth," the Scout Post offered young people leadership learning activities in several disciplines represented by the federal and state agencies in residence at the NSTL.[34]

Selecting Future Leaders

The youth and education initiatives fostered by Jerry Hlass sowed the seeds for development of potential future leaders for the space program and the nation. The first major management change occurred when Henry Auter, often referred to as the NSTL's "gentle giant," retired in February 1980. Auter, who was associated with the installation since its 1961 inception when he helped to plan and build it, was appointed deputy manager in 1963. He went on to serve in that capacity under Captain William Fortune, Jackson Balch, and Jerry Hlass.[35]

33. Lisa Monti, NASA-NSTL News Release, "NASA to Dedicate Teacher Resource Center," 25 June 1985, SSCHRC; "Dedication Ceremonies Held For Teacher Resource Center," *Lagniappe*, 19 July 1985, SSCHRC; Mack Herring, personal notes, master of ceremonies, Teachers Resource Center Dedication, circa June 1985; NASA-NSTL News Release, "NSTL Summer Research Program," 12 June 1980, SSCHRC.
34. "Space-Oceans-Earth Post Receives Charter from Pine Burr Council," *Lagniappe*, 17 August 1981, SSCHRC.
35. Jerry Hlass to NASA Deputy Administrator, "Incentive Award to Deputy Manager (Auter)," 19 February 1980, SSCHRC; "Auter Retires at NSTL," *Picayune Item*, 29 February 1980; "Henry Auter: A Quiet Giant," *Lagniappe*, 26 February 1980, SSCHRC; Christine Uthoff, "Profile: Quiet Giant Achieves the Great as Though the Task Were Simple," *Picayune Item*, 28 April 1985.

Hlass launched a search to replace his dedicated "strong right arm" after Auter decided to step down. Several (six or seven) very capable managers from throughout NASA were interviewed for the position. Using his management and engineering skills, Hlass developed a matrix of questions that he asked the candidates and then used for detailed comparison. In Hlass's mind, the selection had to be from a group of applicants with the very best qualifications, since he knew that his choice would probably become the future NSTL director.[36]

Roy Estess, one of the candidates that Hlass was considering, presented a most impressive resume, which included a long history at the NSTL that began in February 1966. During the Saturn V acceptance test program, Estess was a key member of the S-II static-firing test team. Estess subsequently directed the advanced planning effort for SSME testing.[37]

As an assistant to former site manager Jackson Balch, Estess was one of the "marketeers" who had scouted the technical community for space- and environmental-oriented agencies to locate at the site in the early 1970s. Balch confided to his associates that Estess was his "number one man" in the recruiting endeavor. With Estess's knowledge of the onsite agencies and their activities, he had become head of the Applications Engineering (AE) Office. Hlass recognized that in an AE technical management position, Estess would work closely with federal and state managers involved in the application of remote sensing and technology transfer activities. In 1977, Estess was named a division manager in the NSTL ERL. Estess and his employees of the very visible and popular Regional Applications Program (RAP) were charged with assisting 17 Sun Belt states in transferring Landsat technology to help in management of a number of programs, including land use and agriculture.[38]

Hlass, a firm believer in the attributes of a quality formal education, knew Estess had a bachelor of science in Aerospace Engineering from Mississippi State University. Active in his alma mater's affairs, he also held membership on the Advisory Committee to the College of Engineering at the university.

---

36. Hlass, interview; Roy Estess, interview by Henry C. Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 18 June 1991, p. 21, SSCHRC.

37. *Ibid.* pp. 7–9; Jerry Hlass to Executive Secretary, Incentive Awards Board, NASA Headquarters, "Nomination of Roy S. Estess for NASA Exceptional Service Medal," 5 May 1981; James M. Beggs to Jerry Hlass, "Estess to Receive Exceptional Service Medal," 27 August 1981, SSCHRC.

38. Estess, interview by Dethloff, p. 10; "Roy Estess Named NSTL Deputy Director, *Lagniappe*, 25 September 1980, SSCHRC.

Estess was also a member of the Technical Advisory Committee of the Mississippi Energy Resource and Development Committee.[39]

Hlass, however, admitted that education was not the only important factor considered when he was selecting a deputy director. Hlass also looked at the "character" of the candidates. In Roy Estess he found a devoted family man. Estess and his wife, Zann, were natives of Tylertown, Mississippi, and had two children, Stephen Andrew and Mauri. A resident of Picayune, Estess was involved in a number of civic and church activities, and was named Citizen of the Year in 1974 for his contributions to the community. At the time of the selection, he had been a scoutmaster for 12 years and was on the Executive Council of the Pine Burr Council of Boy Scouts, covering the south Mississippi area.[40]

Based on Estess's experience, education, and personal credentials, Hlass selected him as his deputy, effective 29 August 1980. Hlass was most impressed by Estess's ability to communicate with people at all levels, a point evident in his management of the ERL's RAP, where Estess was in contact with state officials, university scholars, and politicians. Indeed, Hlass's choice of Estess as his deputy was an important decision affecting long-range plans for the installation and, ultimately, the history of the center. After serving over eight years as deputy director, Estess became director of the John C. Stennis Space Center in January 1989.[41]

Hlass made another appointment that had far-reaching effects on the installation when he asked Harry Guin to join the director's staff as assistant for Program Planning and Development. Guin moved his office to the onsite Rouchon House, 1 May 1983, and began assisting Hlass in searching for new programs. Essentially, Guin became a one-man future projects office, a position utilizing upwards of 25 scientists, engineers, and planners at other NASA centers.[42]

---

39. *Ibid.*
40. Roy Estess, interview by Mack Herring and Myron Webb, audio tapes, SSC, MS, 7 July 1995, SSCHRC.
41. Hlass, interview; State of Mississippi, House Concurrent Resolution No. 128, "A Concurrent Resolution Commending and Congratulating Roy. S. Estess, Director of the John C. Stennis Space Center," 27 March 1996; Roy Estess, interview by Mack Herring and Myron Webb, notes and audio tapes, SSC, MS, 24 April 1996, SSCHRC; Gerald Smith, telephone interview by Mack Herring, Atlanta, GA, 18 April 1996; Mack Herring, NASA-NSTL News Release, "Estess Appointed NSTL Deputy Manager," 29 August 1980, SSCHRC; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 4 April 1996.
42. "Guin Named to Director's Staff," *Lagniappe*, 5 May 1983, SSCHRC; "Harry Guin Receives New Appointment," *Lagniappe*, 21 August 1986; Harry Guin Biography, SSCHRC. The author enjoyed a close relationship with Mr. Harry Guin, first meeting him in the summer of 1963. During the many years we worked together on many projects, such as the establishment of the Visitors Center in 1983–84 and the dedication of the Stennis Space Center in 1988.

Guin, who enjoyed meeting and working with new people, such as program managers and planners at Headquarters and other centers, was a natural for the position. The University of Alabama graduate was known for his "soft shoe" presentations and his forceful, "Coach Bear Bryant" persuasive personality. Many considered him a "born leader" who quickly attracted friends and motivated people.[43]

Hlass encouraged Guin to get involved with the people managing programs such as the U.S. Air Force Heavy Lift Launch Vehicle, the National Aerospace Plane, the NASA Commercial Programs Office, and the Space Station. With continued support and encouragement from Hlass, Guin was instrumental in helping the NSTL gain work in all of these major programs. Guin's dogged persistence and belief that the NSTL should seek its future where it began—as the nation's premier center for propulsion testing—paid off years later. Sadly, Guin lost his life in an automobile accident in 1993.[44]

The Earth Resources Laboratory: Studying The Earth From Space

By 1980 when Jerry Hlass selected Estess as his deputy and Guin as his future projects manager, the NSTL Earth Resources Laboratory (ERL) was completing its first decade conducting research investigations to demonstrate applications of remote sensing techniques. Using data generated by satellites, aircraft, and human-operated spacecraft, the "Lab" had been extraordinarily successful in learning how to utilize specialized information for practical use here on Earth. Perhaps, even more importantly, the Lab scientists and technicians became masters at teaching others how to utilize remote sensing technology in a wide variety of areas, such as agriculture planning, resources management, and environmental monitoring.[45]

The ERL moved from the NSTL to the Slidell Computer Center (later known as the Slidell Computer Complex) early in 1976 to make way for the

---

43. Hlass, interview by Mack Herring, 27 February 1996; Pat Mooney, interview by Mack Herring, Slidell, LA, 30 March 1996.

44. *Ibid.*

45. Thomas O. Paine to John C. Stennis, 1 June 1970, NASA Historical Reference Collection (henceforth referred to as the NHRC), Washington, DC; NASA-MSFC News Release, "Establishment of Earth Resources

Navy. Hlass, however, convinced NASA Headquarters to fold the Lab back into his NSTL organization in 1977. The administrative functions of the ERL were moved from Slidell to the NSTL almost immediately. As soon as the Navy transferred to its new NSTL quarters, vacating the old ERL spaces, most of the Lab's people returned to the site. The only exception was a small unit of about 20 people responsible for photographic processing and field-verification data. At that time about 25 civil service personnel and 85 support contractor personnel with Lockheed Management Services Company were associated with the ERL. During its organizational life, the Lab's workforce ranged from 25 to 50 civil servants and 80 to 175 Lockheed support personnel.[46]

The ERL's first director was Robert O. Piland, a respected member of Dr. Robert Gilruth's science staff at the NASA Manned Spacecraft Center (JSC), Houston, Texas. Piland organized the ERL at Houston and established it physically at the NSTL in 1970 as a component of the JSC—at the insistence of Senators Stennis and Ellender. D.W. "Wayne" Mooneyhan, a member of the Saturn V test team at the MTF and a key member of Jackson Balch's staff, was named ERL's first deputy director. Mooneyhan succeeded Piland as director in 1973, when the latter returned to Houston.[47]

Like Estess, Mooneyhan was instrumental in helping Balch develop his strategy for bringing in new business and new agencies when the Apollo program began to wane. In fact, Mooneyhan, who worked side-by-side with Estess during the S-II rocket testing, was preparing the Space Shuttle Main Engine (SSME) proposal when he was selected as deputy to Piland for the new ERL in 1970. Mooneyhan approached the ERL deputy director position

---

Laboratory," 9 September 1970, SSCHRC; "Earth Resources Program Due for State Facility" *Vicksburg, Mississippi Evening Post*, 9 September 1970; Paul D. Lowman, Jr., "The Earth from Orbit," *National Geographic*, Washington, DC, November 1966, pp. 645-670; NASA-NSTL Office of Applications Engineering, "*National Space Technology Laboratories*, capability document, November 1975, pp. 46-47, SSCHRC; NASA-NSTL, "NSTL Earth Resources Laboratory Developing Technology Through Research," brochure, ud., Washington, DC, pp. 1-2, NHRC.

46. "ERL Moving from NSTL to Slidell Facility," *The Times-Picayune*, 24 January 1976; Maria Watson, "NASA Begins Relocation of Earth Resources Lab," *The Daily Herald*, 20 January 1970; NASA-NSTL, briefing, "Relocation of NSTL Earth Resources Laboratory from Slidell Computer Complex To NSTL," 2 May 1979, SSCHRC; D.W. "Wayne" Mooneyhan, interview by Mack Herring, Picayune, MS, 5-6 April, 1996.

47. Gil Webre, "MTF's Role in the 70s: "Space Technology," *The Times-Picayune*, 8 July 1973; Activities Briefing, "Earth Resources Laboratory," Mississippi Test Facility (MTF), 31 March 1972, SSCHRC; Organization Chart, Earth Resources Laboratory (ERL), MTF, 1972, SSCHRC; Dr. C.C. Kraft, "Manned Spacecraft Center, Earth Resources Laboratory Charter," circa 1972, SSCHRC; Kenneth D. "Ken" Cashion, interview by Charles Bolton, Mississippi Oral History Program, University of Southern Mississippi, vol. 466, 18 August 1993, pp. 6-10, SSCHRC; Mooneyhan, interview.

with excellent management experience literally proven "under fire" during the static-testing of the powerful Saturn V stages when split-second decisions were crucial. His credentials and knowledge of the NSTL dated back to his early days as a member of the Working Group in Huntsville.[48]

A little known fact that also played heavily in Mooneyhan's selection as the Lab's first deputy director was his work with Piland and Gilruth in creating the ERL. After Senators Stennis and Ellender insisted that NASA locate a program at the MTF to show "good faith," Piland and Gilruth came to the site at the direction of NASA Headquarters. Mooneyhan spent two days working with the JSC executives and the result was the framework for the early ERL.[49]

Basically, the Lab was designed to be compatible with the environmental agencies planned for the MTF and to be responsive to the needs of the user community in the Gulf South. Because of internal NASA "territorial disputes," the jurisdiction on paper limited the ERL facilities to research investigations in Mississippi and Louisiana.[50]

Surrounding Mississippi was the JSC territory in Texas, and the Marshall Space Flight Center (MSFC) territory in Alabama and Tennessee. The KSC territory was in nearby Florida. The ERL quickly and quietly extended its boundaries into other states, and eventually expanded until it was literally performing its mission on a global scale, with the United Nations as one of its customers. The extent of the ERL's reach was exemplified when Mooneyhan was invited to present a paper in 1979 on "Improvement of Selected Satellite Applications Through the Use of Microwave Data," at the Congress of the International Astronautical Federation in Munich, Germany. Every nation in the world was represented at the gathering. Obviously, the ERL had grown from its modest, regional status into an organization of national and international prominence.[51]

Nevertheless, the Lab's simple organizational structure allowed it to easily expand as technology developed and the user community demands grew. The

---

48. Kraft, "Manned Spacecraft Center"; Estess, interview by Dethloff, pp. 5–6; Mooneyhan, interview.

49. Mooneyhan, interview

50. *Ibid.* During interview with author, Mooneyhan alluded to NASA's traditional management scheme in place when the ERL was established. According to NASA's scheme, the U.S. was divided into "territories" and the territories were assigned to the various field centers. Mooneyhan said the ERL did not pay much attention to the foolish territorial chart and eventually operated "worldwide."

51. Mooneyhan, interview; Mack Herring, NASA-NSTL News Release, "Mooneyhan Attends International Congress," 9 November 1979, SSCHRC.

ERL's first organizational plan placed Piland as director; Mooneyhan in charge of the Land Remote Sensing Applications group; E.L. "Lee" Tilton, III, chief of the Sea Remote Sensing Applications group; and S.L. "Sid" Whitley, lead of the Data Acquisition and Management group.[52]

The very nature of remote sensing technology immediately pointed the researchers to state, local, and private enterprise practical needs. With the almost unlimited data from Landsat after it was launched in 1972 and the added mobility of a Lear Jet. The Lab's testbeds for research and markets for applications of space and airborne technology were virtually unlimited—bound only by the imagination of Mooneyhan and his researchers.[53]

The Laboratory personnel's pioneering technology led them to study the rain forest in South America; help inventory vast lands of the Navajo Indians in New Mexico; study plant life in the Olympic National Park in Washington; catalog wheat fields in Kansas; and even explore archaeological sites in search of ancient civilizations in Peruvian jungles.[54]

As the Lab's reputation flourished, it was called for immediate assistance when hurricanes struck Florida and the Gulf Coast; tornadoes touched down in Mississippi and Alabama; forest fires raged in northern California, and mosquitoes invaded villages in Kenya. One of the most effective programs was helping stem the flow of illicit drugs into our country by identifying growth areas of certain plants in Mexico. In a joint United States/Mexican government program, Curb Illegal Narcotics (CIN), Lab personnel concluded that their studies showed a drastic reduction in the amounts of dangerous Mexican drugs available for smuggling into the U.S. Veteran ERL scientists

---

52. ERL Organization Chart, 1972, SSCHRC.

53. "Landsat in Excellent Condition, NSTL Contributions Significant," *Lagniappe*, 18 August 1982, SSCHRC; NASA-NSTL News Release, "NSTL Jet Assists Firefighters in Northern California Forests," 21 September 1987, SSCHRC; Cashion, interview by Bolton, pp. 15–16; "NSTL Experts Conduct Training for Nation's Top Archaeologists," *Lagniappe*, 21 September 1987, SSCHRC; "Landsat Successfully Launched," *Lagniappe*, 19 March 1984, SSCHRC.

54. "Laboratory Hosts World Landsat Group," *Lagniappe*, 18 May 1979, SSCHRC; Dr. Armond Joyce, telephone interview by Virginia A. Butler, SSC, MS, 22 March 1996; Dr. Armond Joyce, interview by Mack Herring, SSC, MS, 25 March 1996; "ERL's Bill Cibulla Bridges the Gap in Sciences," *Lagniappe*, 21 September 1987, SSCHRC; Mooneyhan, interview; Joyce, interview by Herring; P.K. "Pat" Conner, interview by Mack Herring, Petal, MS, 4 April 1996; Dianne Johnson, University of Colorado, and Mack Herring, NASA-NSTL, News Release, "NASA, University Of Colorado, Boulder, Team Up for Study of Peruvian Andes," 17 April 1985, SSCHRC; Leon Perry, NASA Headquarters and Mack Herring, NASA-NSTL, News Release, "NASA Technology Uncovers Possible Ancient Civilization," 29 November 1985, SSCHRC; Myron Webb, NASA-SSC News Release, "NASA Archaeologist Tom Sever Receives Major Award," 16 May 1990, SSCHRC.

and researchers all agree that the CIN program, the Navajo Indian lands inventory, and the Olympic park plant life study were extremely important programs and good examples of their work. One additional program that gave the ERL an opportunity to showcase its wide array of space technology and applications skills was the Regional Applications Program (RAP).[55]

Initiated in 1977 by the Office of Space and Terrestrial Applications, RAP was designed to provide a mechanism for transferring Landsat remote sensing technology to state and local government agencies involved in resource management. The NSTL program incorporated the 17 "Sun Belt" states.[56]

Indeed, the ERL was "outside" its originally assigned territory, operating in the backyards of not only the MSFC, but the JSC and the KSC as well. The assignment was gerrymandered to give the ERL the midwestern states to assist in the project. The expertise the Lab demonstrated in its first seven years of operation was proof for Headquarters that the ERL could successfully complete its assigned tasks.[57]

With Roy Estess as ERL RAP manager, the program was tailor-made for ERL scientists and researchers to apply technology in many areas of interest to state governments. Mooneyhan stated that Estess "worries about people" and that, as the RAP manager, he was very effective in communicating with the state officials and people at all levels of the political hierarchy. Estess said the success of RAP was enhanced by the involvement and personal support of Wayne Mooneyhan—ERL director. The staff's level of commitment to excellence was evident and within one year every Sun Belt state was contacted and began learning how to use the data from space.[58]

The RAP projects included automatic computer classification of Landsat data of a land area selected by a state as an information source for important resource management decisions. The program also provided hands-on train-

---

55. Joyce, interview by Herring; Conner, interview; "NASA-Navajo Enter Agreement," *Lagniappe*, 11 November 1977, SSCHRC; "Navajo Project in Second Phase Using Landsat Satellite Data," *Lagniappe*, 15 March 1979, SSCHRC; Conner, interview.
56. NASA-NSTL Earth Resources Laboratory, "Proposed Plan to Accomplish the Regional Applications Program Assignment to ERL and to Realign ERL with NSTL Organizationally," 1 March 1977, SSCHRC; "Regional Applications Program Transfers Technology to States," *Lagniappe*, 13 February 1981, SSCHRC; Conner, interview; Mooneyhan, interview; "Regional Symposium Provides 'Open Forum' for Data Users," *Lagniappe*, 21 November 1979, SSCHRC; Joyce, interview by Herring; Estess, interview by Dethloff, p. 20.
57. NASA-NSTL Earth Resources Laboratory," Proposed Plan. . ." 1 March 1970; Mooneyhan, interview.
58. "Regional Applications Program Transfers Technology to States," *Lagniappe*, 13 February 1981, SSCHRC; Mooneyhan, interview.

ing in using computers to analyze Landsat information. P.K. "Pat" Conner followed Roy Estess in the RAP manager's position when Estess was appointed Deputy Director of the NSTL.[59]

Conner became one of the NSTL's first women technical managers. She previously worked for the National Park Service with the Navajo Indian Nation in its resource management programs. With her experience and proven management ability, Conner quickly gained the respect of subordinate researchers working with her and the state officials and technical personnel with whom she dealt. She is remembered today for her effective contributions at the NSTL and later at NASA Headquarters.[60]

The ERL research and remote sensing applications endeavors were not limited to projects requiring formal arrangements, such as RAP. The Lab scientists found the development of computer technology and specialized sensors could be applied to more human uses—as medical diagnostic tools and as inventions to assist low-vision persons to "see," even if classified legally blind.[61]

Many scientists and researchers were responsible for ERL's pioneering developments in remote sensing and applications, some of whom worked for Lockheed. The Lab's scientists and researchers were very effective because Mooneyhan encouraged them to pursue their ideas and utilize their own special talents in a nonrestrictive atmosphere, much like the early days of the famous Bell Labs when so many noted inventions came from the scientists associated with that famous institution.[62]

Dr. Armond Joyce came to the ERL with a specialty in environmental science and forestry, a combination in great demand in the early days of the Lab. Joyce additionally had used remote sensing when researching both his master's thesis and his Ph.D. dissertation. He came to the ERL with four

---

59. Landsat Demonstration Project Completed in South Carolina," *Lagniappe*, 19 March 1981, SSCHRC; "Faculty Members Are Students in Remote Sensing Classes," *Lagniappe*, 23 May 1980, SSCHRC; Conner, interview.
60. "NASA Navajo Enter Agreement," 11 November 1977; "Navajo Project in Second Phase Using Landsat Satellite Data," *Lagniappe*, 15 March 1979, SSCHRC; Conner, interview; Patricia Penton, interview by Mack Herring, SSC, MS, 4 April 1996.
61. "NSTL Uses Satellite Technology for Analyzing the Human Body," *Lagniappe*, 20 June 1985, SSCHRC; Mack Herring, NASA-NSTL News Release, "NASA, Johns Hopkins Use Space Technology to Improve Sight," 28 April 1988, SSCHRC; Barbara Selby and Myron Webb, NASA-News Release, "NASA, Johns Hopkins Unveil System to Help Visually Impaired," 13 May 1992, SSCHRC; Mooneyhan, interview; Joyce, interview by Herring; Robert V. Bruce, *Alexander Graham Bell and the Conquest of Solitude* (Boston: Little Brown And Company 1973), pp. 375–378.
62. Joyce, interview by Herring; Joyce, interview by Butler; Dr. Joyce Assists Honduras Officials," *Lagniappe*, 21 April 1978, SSCHRC.

years experience in the operational use of remote sensing for natural resource inventory throughout the U.S., Central America, and South America. Recruited in 1971 by Alex Perisich, then assistant to the director of the ERL—Robert Piland, Joyce was a civil servant transfer from a position with the Natural Resource Division of the Interamerican Geodetic Survey to ERL. The purpose of his transfer was to develop applications for land resource inventory and monitoring through remote sensing.[63]

Prior to recruitment, Joyce read about the ERL in the *Miami Herald* in 1971 while involved in environmental work in the Panama Canal Zone. The newspaper article said the work of the newly organized ERL would be "international" in scope. Joyce was to discover, however, after talking with Piland that the concept for the Lab had changed. According to Piland, after the article was written, it was decided that the Lab would at first be "regional," but the ERL's work would become international because "satellites look at the whole world." Piland's prediction proved to be true.[64]

S.L. "Sid" Whitley, another researcher, worked as a project mathematician, evaluating the performances of guided-missile systems and space probes. Earlier in his career, Whitley was responsible for testing parachutes used in the Project Mercury human spaceflight program. Whitley, who previously worked at the JSC, was one of the early scientists transferred to the Lab in 1971. He served as chief of the Data Acquisition and Management group in the early ERL organization and later became deputy director of the laboratory.[65]

As an ERL physicist and botanist, Dr. W.G. "Bill" Cibula gained recognition with his research in mycology, the study of fungi, and ecology. Noted for his contributions to the Olympic National Park study, which Mooneyhan called a space "benchmark" for remote sensing, Cibula enjoyed the challenge of "taking a piece of information and determining its usefulness." Like Joyce and Whitley, Cibula traced his attachment to the Lab back to 1971.[66]

---

63. Joyce, interview by Butler.
64. *Ibid.*
65. David Jones, "Sid Whitley—Working with Landsat, Systems Development," *Lagniappe*, 22 August 1980, SSCHRC; "Major Agency Awards Presented to NASA's Whitley, Wolverton," *Lagniappe*, 17 December 1979, SSCHRC; Mooneyhan, interview; Conner, interview; "Peten" *Encyclopedia Americana vol. 18* (Danbury, Conn.: Grolier, IN, 1994), p. 540.
66. "ERL's Bill Cibula Bridges the Gap in Science," *Lagniappe*, 21 September 1987, SSCHRC; Bill Cibula, biography, SSCHRC; Mooneyhan, interview.

In more recent times, the Lab has acquired the unique and extraordinary talents of NASA's first archaeologist, Dr. T.J. "Tom" Sever. Sever pioneered the use of advanced aircraft and satellite remote sensing technology to study ancient civilizations in Central and South America. Through Sever's research, using remote sensing, an extensive area of Mayan sites were identified beneath a rain forest canopy in the Peten area of Guatemala, considered the Mayan civilization heartland.[67]

Also, information was revealed through Sever's studies that suggested a civilization existed in the subtropical Peruvian jungles prior to that of the Incas. Sever's work was recognized by the University of Colorado, where he received the prestigious Morris Award, and by the National Geographic Society, which has included his work in its studies and even funded his research into the fascinating Mayan civilization.[68]

One creative ERL scientist used ERL technology in a cooperative effort with John Hopkins Wilmer Eye Institute in Baltimore, Maryland. Dr. Douglas Rickman managed a project, using technology developed for computer processing of satellite images, that culminated in improving visual capability of low-vision patients by enhancing and altering images to compensate for their impaired eyesight.[69]

In another project, Rickman teamed with researcher Jim Anderson to develop image-enhancement techniques that advanced the diagnostic tools of Nuclear Magnetic Resonance scans. This project was a partnership between NASA's ERL and the Washington University Medical Center in St. Louis, Missouri.[70]

Jerry Flanagan, ERL researcher, grew up in Louisiana where he spent his free time and spare money launching model rockets. With NASA, he became one of the first engineers to take part in an aircraft remote sensing technology program. Flanagan previously worked at the JSC on a variety of experimental packages flown on the Space Shuttle. He transferred to the NSTL in 1976 and began directing ERL data-acquisition activities, including building

---

67. Thomas L. Sever, "Curriculum Vitae," 1996; Memorandum for the Record, "T. Sever, Trip Report-March 11–22, 1991, Guatemala," 9 April 1991.

68. *Ibid.*

69. Shelby, Webb, News Release, "NASA, Johns Hopkins..."; Herring, Johnson, News Release, "NASA, University Colorado Team Up..."; "NSTL Uses Space Technology to Assist Low-Vision Patients," *Lagniappe*, 20 May 1988, SSCHRC.

70. *Ibid.*

remote sensors. The inventive work of Flanagan and others contributed to the Lab's reputation for "world class" sensor development.[71]

The ERL chief of the Systems Development Branch in the mid-1980s, Billy Edwards, played a major role in keeping the NSTL on the "leading edge" of automated data-processing technology. While serving as ERL's acting director in 1985, Roy Estess said Edwards was largely responsible for developing several large and complex data-processing systems at the NSTL and abroad.[72]

True, ERL scientists and researchers used their expertise across the nation and, literally, around the world. But wherever they traveled, most of them took along a special computer-software package that many referred to as the "heart" of the Lab which was developed by Ronnie Pearson, a colleague still remembered by ERL personnel.[73]



Alabama native Ronnie Pearson, a mathematician in the National Space Technology Laboratories' (NSTL) Earth Resources Laboratory, designed most of the Earth Resources Laboratory Applications Software (ELAS), the Laboratory's basic software package. (SSC-80-122-9)

An unorthodox computer genius, Pearson took bits and pieces of some basic research from the Lab's early days and developed the Earth Resources Laboratory Applications Software (ELAS) package that became an information

71. David Jones, "NASA's Jerry Flanagan—'Sensing' Opportunities," *Lagniappe*, 16 February 1983, SSCHRC; Mooneyhan, interview.
72. "Goals Set and Efforts Put Forth Accomplish Much for Billie Edwards," *Lagniappe*, 19 July 1985, SSCHRC; Mooneyhan, interview; Estess, interview by Herring and Webb, 7 July 1995.
73. "As Mathematician Stereotype Pearson Does Not Compute," *Lagniappe*, 25 April 1980, SSCHRC; Mooneyhan, interview.

mainstay for the Lab scientists and technicians. ELAS is a transferable set of software for processing imagery data, as well as topographic, soil, rainfall, and other data, to produce resource management and socioeconomic information.[74]

The software was used by Lab personnel and taught to others in special classes and demonstrations. ELAS was also distributed to remote sensing data users all over the U.S. and in foreign countries. By 1984, the software was used in 25 states, 150 government agencies, and in scores of foreign countries where remote sensing research and development were conducted. ELAS is still the basic package used by United Nations' experts everywhere.[75]

The influence of the Lab and its scientists and researchers will be felt for many years to come. A shift at NASA Headquarters, in the early and mid-1980s, from an emphasis on technology applications to "pure science," caused a funding drain that almost extinguished the once vibrant Lab.[76]

Mooneyhan left in 1985 to become director of the United Nations' Global Information Resources Data Base in Geneva, Switzerland. His long-time friend and colleague, Roy Estess, was assigned by Hlass to serve as interim ERL director. Evidence of the Lab's research is still prevalent wherever people study Earth from the vantage point of space, whether in the public or private sector, and in military use for the defense of our country.[77]

A Blooming Science

In the shadows of the giant rocket test stands and just a shout away from the humming computers displaying images from space, a down-to-earth science emerged at the NSTL from what appeared to be a common lily pond. Dr. B.C. "Billy" Wolverton and Rebecca C. "Becky" McDonald began their Vascular Aquatic Plant program with the beautiful but dreaded, water hyacinth plant. Wolverton and McDonald converted the pesky, nuisance plant into a useful natural resource.[78]

---

74. Cashion, interview by Bolton, pp. 9-10.
75. "NSTL to Host ELAS User Group," *Lagniappe*, 20 September 1984, SSCHRC; Mooneyhan, interview.
76. "Dr. Anthony Calio Visits Installation," *Lagniappe*, 25 July 1980, SSCHRC; "NASA Employees Recognized for Outstanding Achievements," *Lagniappe*, 25 September 1980, SSCHRC; Mooneyhan, interview.
77. Conner, interview; Mooneyhan, interview.
78. Keith Skantz, "Earth Resources Lab Work Helps Farmers, Fisherman," *Picayune Item*, 25 February 1979; Gil Webre, "Water Hyacinth: A Disposal Plant," *The Times-Picayune*, 2 March 1975.

The water hyacinth—the fastest growing plant known to humans—is one of the most successful colonizers in the plant world. Originating in Venezuela, the water hyacinth was first brought to this country by Japanese exhibitors at the 1884 Cotton States Exposition in New Orleans. Because of their beautiful blossoms, the plants were kept as souvenirs in New Orleans and its vicinity. As a result, the hyacinth spread all over the southeastern United States. Unfortunately, the hyacinth gained an outlaw reputation because it hampered traffic in waterways. Before Wolverton began his research at the MTF in 1971, government and private entities paid large sums of money trying to eradicate the plants. Through the plant program, however, the hyacinth became useful as a natural resource, cleaning domestic and laboratory waste water with its large root system resembling octopus tentacles. Wolverton and McDonald used the plants, which produce beautiful lavender blossoms, to clean all waste generated at the NSTL, including laboratory waste containing chemicals and heavy metals.[79]

In the final analysis, the plant program saved the government more than $1 million up front, and millions more for operations and maintenance will be saved over the years. Wolverton gained worldwide recognition for the Vascular Aquatic Plant program. Newsmen from Germany, England, Japan, and many other countries visited the NSTL in order to obtain the plant program story for their viewers. Wolverton and the aquatic plant program were also featured on major American television networks, such as NBC and CNN. In addition, Wolverton assisted with designing and installing similar waste treatment systems in Coral Springs and Disney World, Florida; in Hercules and San Diego, California; and Rio Hondo, Texas.[80]

Before his career with ERL ended, Wolverton was inducted into the U.S. Space Foundation Hall of Fame. Billy Wolverton and Rebecca "Becky" McDonald received many other awards and recognitions for their simple "blooming science," and they are continuing their work in separate endeavors for NASA and private industry.[81]

---

79. *Ibid.*

80. "Research Turns Water Hyacinth from Nuisance to Natural Resource," *Lagniappe*, 15 June 1979, SSCHRC.

81. Dr. B.C. "Bill" Wolverton, interview by Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 421, 1993, 30 October 1992, pp. 5–10, SSCHRC; Mack Herring, NASA-NSTL News Release, "New Hybrid Wastewater Treatment System," 6 July 1981, SSCHRC; "NASA Employees Recognized During NSTL Awards Ceremony," *Lagniappe*, 18 April 1983, SSCHRC; Wolverton, interview by Patterson, 13; Wolverton, interview by Herring, Picayune, MS, 12 April 1996. The Billy Wolverton story goes on. He now works as a consultant operating out of his home, which is specially designed as an envi-

Hlass's Plan Pays Off

As the NSTL approached the mid 1980s, Jerry Hlass was able to see most of his goals and "vision" for the south Mississippi NASA site attained. He set out with a carefully planned agenda when he took over in 1976. In a sometimes methodical, deliberate fashion, Hlass continued marking off his early action items, which included a new mission statement that was quickly completed and approved at Headquarters. By 1985, the NSTL had control over a strong and effective SSME support role, complete with independent and adequate Headquarters' funding. The Hlass team provided relocation and settling of the Navy's oceanographic programs, with its approximately 1,400 personnel. The NSTL also gained an internationally recognized ERL program, and the NASA organization evolved into an effective, high-morale, "can do" team which was applauded by Headquarters for it accomplishments.[82]

Hlass improved community relations and morale with increased community participation in the NSTL activities and with education and visitor programs for area youth. Improved resident agency relations resulted in "tenant satisfaction." Also there was a "new look" for the facility with the addition of a new tugboat, a Lear Jet, and sitewide maintenance on major items, such as the navigation lock and cryogenic barges. In addition, he increased contractor morale with "quality circles," "excellence" study programs, awards, and recognitions. He also initiated future planning with employee participation in management retreats, quarterly reviews, and interdisciplinary team planning.[83]

With his original goals achieved and his vision for a "new NSTL" in sight, Hlass applied his own progressive philosophy by pursuing new work for his people. With Harry Guin as his point person, Hlass set out to garner two new programs: a modest role in the Space Station program and a lead role in the developing Commercial Programs initiative at Headquarters.[84]

President Ronald Reagan's Space Station program announcement on 25 January 1984 was a boost to the Agency and the aerospace industry. With

---

ronmental "showplace." Wolverton's research has led him to use plants to purify the air at home and in the workplace. He designs filters to assist industry with emisions. Wolverton continues to receive recognition for his work, regularly interviewed, and is a lecturer on the international circuit.

82. Hlass notes, SSCHRC.

83. *Ibid.*

84. Jerry Hlass, draft #5, "National Space Technology Laboratories, Goals And Objectives," 28 January 1985, SSCHRC; "Hlass Receives Presidential Award," *Lagniappe*, 20 February 1987, SSCHRC; Hlass, interview.

Hlass's vision for a "new NSTL" in sight, the Space Station initiative came as especially good news for the NSTL. The Space Station would mean additional work for NSTL because: (1) the Space Shuttle would be used to ferry materials and people into orbit to build and operate the orbiting station, ensuring an extended life for the SSME testing program; (2) the ERL expertise had earned a reputation for quality development of spaceborne sensors; and (3) the ERL had the ability to help find appropriate users for the bold new Space Station.[85]

Participation in these important national programs gave every appearance that the NSTL's "time" had come. In fact, Hlass commented immediately after Reagan's Space Station announcement that he "hoped [the] NSTL would be assigned roles in [such an] exciting and important program." He also stated that the "Station" would mean the NSTL would be required to test SSME's for "years to come."[86]

In addition to the known mission of SSME testing for the Space Shuttle's trips to the Station, the NSTL was assigned a support role to the Goddard Space Flight Center. the task was to design a system to produce simulated payload statistics to evaluate the capability of the customer data system before its installation in the Space Station.[87]

The NSTL was also given a role to assist commercial entities in research processes that would ultimately lead them to perform missions on the Space Station. Guin described this NSTL task as a mission "to provide an interface with industry and establish their set of needs and requirements to be incorporated into the ultimate Space Station design where it will be available for them when they get ready to use it."[88]

Key NSTL personnel working on the Space Station project were Sid Whitley, chief of the Sensor and Data Systems Group, and systems analyst Joel Wakeland, charged with design of the simulation system. Pat Conner, chief of Applications Research, was responsible for leading promotion of the Space Station commercial remote sensing mission to develop requirements

85. "President Reagan Announces Comprehensive Plan for Space," *Lagniappe*, 17 February 1984, SSCHRC; Mireille Girard and Pamela W. Edwards, eds., *Space Station Policy And Utilization*, (New York: American Institute of Aeronautics and Astronautics, 1983), pp. 5-7, 14, 116.

86. "NASA Establishes Space Station Teams," *Lagniappe*, 19 March 1984, SSCHRC.

87. *Ibid.*; "A Message from the Director," *Lagniappe*, 18 December 1985, SSCHRC.

88. "Space Station Commercial Group Holds Meeting at Installation," *Lagniappe*, 20 February 1986, SSCHRC.

for potential commercial missions. The NSTL worked with NASA's Jet Propulsion Laboratory on the project.[89]

The Space Station was not the only program the NSTL obtained during its rejuvenated search for new missions. In August 1985, five NASA-funded, nationwide, incentive grants were awarded for "research to promote and stimulate space technology commercial applications." The Mississippi Institute of Technology Development (ITD) in Jackson, Mississippi, received one of these grants to establish the Space Remote Sensing Center (SRSC) at the NSTL. With the new emphasis at NASA Headquarters on commercially oriented programs, the NSTL was selected in August 1985 as one of five recipients nationwide to host a commercial program.[90]

The Space Remote Sensing Center was located at the NSTL in order to capitalize on the expertise and technology of the ERL. Congressman Trent Lott announced that $3.5 million would initially be spent on the SRSC and that 25 high-tech people would be employed.[91]

Hlass, Guin, and David Brannon led the way in obtaining the new program, which would receive funding over the next five years. The NSTL management considered the assignment of a national center for the commercial development of space a credit to the installation's ability to manage programs. The other NASA-funded grants were assigned to the Battelle Institute, Columbus, Ohio; the University of Alabama at Birmingham; the University of Alabama, Huntsville; and Vanderbilt University, Nashville, Tennessee.[92]

The NSTL, however, was the only NASA installation selected to host one of the new commercial space centers. The Mississippi facility became one of the six divisions of the ITD and gained even more recognition in the "commercial" world.[93]

---

89. Working Group, Commercial Earth And Ocean Observations, "Proposed Program for Commercial Earth and Ocean Observations," first draft, July 1985, SSCHRC; Conner, interview.

90. "NSTL Selected as Location for ITD Remote Sensing Center," *Lagniappe*, 20 September 1985, SSCHRC.

91. *Ibid.*

92. *Ibid.*; Harry Guin was a believer in the NSTL's expertise to be the national leader in commercial uses of space. He championed the cause from his earliest days as Hlass's assistant.; Harry Guin, biography, SSCHRC; David Brannon, chief of the Commercial Remote Sensing Office, remembered Guin's early associations with the ERL when dollars were scarce for applications-related work. Guin and others learned many lessons in RAP, and began creatively converting expertise to accommodate "commercial" programs.

93. *Ibid.*

Before The Fall

In less than a decade, Jerry Hlass and his team obtained new programs—involving the ERL, Space Station, and the ITD SRSC. There were no complaints about the NSTL's support of the SSME test program. On the contrary, NASA Headquarters and the MSFC publicly recognized the support government-contractor crew. The recognition focused primarily on the fact that the NSTL never held up a major engine static firing, including the huge task of proving the Space Shuttle's Main Propulsion Test Article (MPTA).[94]

True, the engine testing was at its peak, but there was activity all over the growing installation by the end of 1985. Workers were actually crowded on the big complex, with 4,724 people working for a myriad of space, environmental, and national defense agencies. The Navy successfully relocated 1,389 people from Suitland, Maryland, and the giant Mississippi Army Ammunition Plant employed 1,459 people for its manufacturing program. New construction was under way all over the base, including a new NASA conference center and a Navy building, plus additions and modifications to other buildings.[95]

Locally, community relations could not be better for the positive-minded Jerry Hlass. In 1985, a proud Hlass reported that the NSTL had just pumped $171 million into the economy of south Mississippi. The NSTL employees also contributed over $120,000 to the Combined Agencies Campaign, which disbursed funds to local charities. In November 1985, Hlass and Captain Roger Onorati of the Naval Ocean Research and Development Activity (NORDA) hosted the kickoff of the "Partners In Progress" program, jointly sponsored by the NSTL and the Hancock County Chamber of Commerce. Hlass was pleased with his new community friend, John Mason, president of the Hancock Chamber.[96]

In 1985, the NSTL also participated in the NASA's "Teacher in Space" project, designed to provide NASA with the first civilian to go into space on the Space Shuttle in early 1986. The Teacher In Space project was first announced in August 1984; and Jim McMurtray, NSTL aerospace education

---

94. W.R. Lucas to Jerry Hlass, "Space Shuttle Main Propulsion Test Complex," 25 February 1977.
95. NSTL Personnel Office, "Personnel Strength," December 1985, SSCHRC; Hlass, interview.
96. "NSTL and Hancock County Join in 'Partners in Progress' Effort," *Lagniappe*, 20 November 1985, SSCHRC.

specialist, was chosen by NASA Headquarters to be one of the project mentors. With the help of others at the NSTL, McMurtray was successful in soliciting several hundred Mississippi applicants. The two finalists chosen to represent Mississippi were Connie Moore from Oak Grove High School in Lamar County and Joanne Reid of the Weir Attendance Center in Choctaw County.[97]

The popularity of the Teacher in Space project was evidenced when over 10,000 applicants responded from all 50 states. The competition and the teacher's flight on the shuttle were designed to "bring the space program down to Earth" so most Americans could identify with space travel, and also to add to the prominence of the teaching profession. The applicant chosen was Sharon Christa McAuliffe, a devoted and energetic social studies teacher from Concord, New Hampshire.[98]

They Touched The Face Of God

For years, NASA advertised that the Space Shuttle would provide the nation with "routine access to space." With 24 successful flights, a space-struck American public had no reason to think otherwise. NASA officials debated what category of Americans should be the first civilians to fly in space. Many thought the first civilian should be a newsperson, someone who had the talent and background for recording the mission.[99]

President Reagan's "Project Liftoff," administered by NASA, resulted in the final decision that the first civilian to fly in space should be a teacher. As a result, Christa McAuliffe was the envy of practically every teacher in America as she trained in Houston for the January 1986 flight. She followed a rigorous training program, similar to that of a payload specialist, but not as intensive as an astronaut. In addition, McAuliffe developed "lesson plans" to use during the flight in a "classroom in space," enabling literally millions of

---

97. Howard Benedict, *NASA: The Journey Continues*, (Houston: Pioneer Publications, Inc., 1989), pp. 101, 102; Jim McMurtray, telephone interview by Mack Herring, SSC, MS, 14 April 1996.
98. "More Than 10,000 Teachers Apply for Flight on the Shuttle," *Lagniappe*, 21 March 1985, SSCHRC; McMurtray, interview.
99. Henry C. Dethloff, *Suddenly Tomorrow Came...A History Of The Johnson Space Center* (Washington, DC: NASA, SP-4307, 1993), p. 293.

children across America to have the opportunity to listen to discussions by McAuliffe from space.[100]

The Space Shuttle flight of 51-L, using the orbiter *Challenger*, finally got its turn on the launch pad in January 1986. After four bothersome postponements, the major concern related to the launch was a weather forecast of extremely frigid weather to follow the blustery winds whipping against the shuttle pad. Weather officials predicted a mass of cold arctic air would drop temperatures below freezing on the morning of the launch. Nevertheless, NASA proceeded with preparations for *Challenger's* launch on 28 January 1986, hoping for a break in the weather and the opportunity to avoid another delay.[101]

Along with McAuliffe, the crew members represented a cross section of American society, including Commander Francis R. "Dick" Scobee, 46, from Cle Elum, Washington, who was making his second shuttle flight; Pilot Michael J. Smith, 40, from Beaufort, North Carolina, who had waited years for the flight; mission specialists Ellison S. Onizuka, 39, born in Kealakekua, Kona, Hawaii; Donald E. McNair, 35, a native of Lake City, South Carolina; Judith A. Resnik, a 36-year-old native of Akron, Ohio; and Gregory B. Jarvis, 41, Detroit, Michigan, a Hughes Aircraft Company satellite engineer and payload specialist.[102]

On the morning of the launch, the sunshine's bright rays illuminated a blue sky and lit up the beaches at Cape Canaveral, boosting the spirits of the faithful spectators huddling in the freezing cold. The major news story in Florida that day was the cold weather, not the launch of *Challenger.* Citrus growers in central and south Florida were very concerned about near-freezing temperatures because they were afraid that they would lose millions of dollars worth of crops. As a result, on the morning of the ill-fated *Challenger* launch, most Florida residents were more concerned with the weather than the success of the launch.[103]

In Mississippi, over 200 local school children gathered at the NSTL Visitors Center to watch the launch on NASA's closed circuit television. The

---

100. *Ibid.*; "Live Lessons Set to Highlight 'Teacher in Space' Shuttle Flight," *Lagniappe*, 21 January 1986, SSCHRC; McMurtray, interview.

101. William P. Rogers et al., *Report Of The Presidential Commission On The Space Shuttle Challenger Accident* (Washington, DC: U.S. Government Printing Office, 1986), pp. 13–18, 82.

102. "List of Deceased Astronauts," [http://spacelink.msfc.nasa.gov/NASA.Projects/Human.Space.Flight/Astronauts/Astronaut.Factbook/Biographical.Sketches/Deceased.Astronaut.4/18/96], 1993, pp. 1–7.

103. Benedict, *NASA: The Journey Continues*, pp. 101–102.

children had closely followed Christa McAuliffe's preparations for the flight and anticipated her expected lessons from space. A number of NSTL employees also had a special interest in the launch, because most of the crew had visited the installation. Sadly, during pilot Mike Smith's last visit, he told his escort to "keep your fingers crossed that I will soon be assigned to a flight."[104]

Cheers went up when the *Challenger* lifted off in a loud, popping roar from Pad 39-B at 11:38 a.m. EST on 28 January 1986 and quickly accelerated into the deep blue sky over the ocean. Watching the liftoff, with the families of the crew, were 119 "Teacher in Space" finalists and several thousand public well-wishers. Everyone cheered and pointed to the sky as the *Challenger* rolled and moved swiftly upward for 73 seconds. Then, the shuttle came apart in a giant, ugly off-color pinkish-red fireball, right before everyone's eyes! What NASA feared secretly as a "worse case scenario" had happened.[105]

The falling spacecraft pieces left streaming contrails of white smoke as they descended downward into the Atlantic Ocean. Scores of chunks of the *Challenger* fluttered toward the blue ocean, as if from an exploding Fourth of July skyrocket—falling, splashing, bit-by-bit into the sea. Millions watching on television, like the thousands of viewers at the Cape and the NSTL Visitors Center, were at first dumbfounded. Many reported they thought the crew would somehow escape. Some who saw the awful tableau said they thought the careening solid-rocket motors that were sent off in divergent directions after the fireball were "escape rockets." No one had ever seen such a sight at Cape Canaveral before.[106]

Steve Nesbitt, the public affairs commentator at Mission Control in Houston, in a calm, informative, but disbelieving voice, announced, "Obviously we have a major malfunction. . . We have no down link. . . We have a report from the flight dynamics officer that the vehicle has exploded."[107]

The loss of the *Challenger* and its crew on Space Shuttle flight 51-L devastated the nation and the world. The crew's enthusiastic supporters at the NSTL were specifically affected by the awful explosion—for two reasons. The workers at the Mississippi space facility knew most of the members of

---

104. "Live Lessons Set to Highlight 'Teacher in Space' Shuttle Flight," *Lagniappe*, 21 January 1986, SSCHRC.
105. Paula Harrison and Ann Mittman, "Exploration Shatters Dream for Teachers, Students" *(Cocoa Beach, FL) Florida Today*, 29 January 1986, Rogers, *Report of the Presidential Commission*, pp. 82–104.
106. Benedict, *NASA: The Journey Continues*, p. 102; Rogers, *Report Of the Presidential Commission*, pp. 82–104.
107. *Challenger* resource tape, JSC-1531B, NASA-Johnson Space Center.

the crew for they visited the site early in their careers as astronauts. Also some returned to witness shuttle engine static-firings and to learn more about the main propulsion system that drives all American Space Shuttles.[108]

Even worse for the NSTL workers, many in the media immediately following the disaster believed the explosion was caused by a failure of an SSME that had been test-fired at the NSTL. As a result, the hours following the disaster were an extremely painful and frustrating time for the men and women of the NSTL. There was some comfort to be gained by the south Mississippi men and women when it was confirmed that the accident was caused by a failure in the joint between the two lower segments of the right Solid Rocket Motor.[109]

---

108. Hlass, interview, 27 February 1996.
109. *Ibid.*

CHAPTER 13

Testing the Way

The Morning After

A proud nation brought NASA's victorious space explorers home "shoulders high" following a half-dozen inspiring voyages to the surface of the Moon. Americans cheered their space travelers as heroes after 24 missions aboard the Space Shuttle, a wondrous ship that several astronauts have called the "Magnificent Flying Machine." But, by the mid-1980s, following the fiery crash of the Space Shuttle *Challenger*, the nation and the world joined the shocked and bereaved NASA family as it mourned the loss of seven beloved comrades.[1]

Just hours after the tragic January 1986 explosion, Jerry Hlass choked back his emotions to rally the National Space Technology Laboratories (NSTL) team. At the time he addressed a room full of his employees and news reporters who had descended on the installation, no one was sure of the exact

1. A.E. Houseman, "To An Athlete Dying Young," Oscar Williams, ed., *A Little Treasury Of British Poetry* (New York City, NY: Scribner's, 1951), pp. 874; Norman Mailer, *Of a Fire on the Moon* (New York City, NY: Little Brown and Company, 1969), pp. 399, 402; NASA Headquarters Public Affairs, *Apollo* (Washington, DC: NASA, 1972), pp. 32–33, 63; "Columbia Performs Flawlessly," *Lagniappe*, 20 April 1981, Stennis Space Center Historical Records Collection (henceforth referred to as SSCHRC); Roger D. Launius, *NASA: A History Of The U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Co., 1994), p. 116.

cause of the accident. Some news reporters speculated that the explosion may have been caused by the Space Shuttle Main Engines (SSMEs) that were tested at the NSTL.[2]

It was soon learned from the recorded flight data that all three main engines were working perfectly at the time of the accident. This fact was later confirmed by the Presidential Commission on the Space Shuttle *Challenger* that stated in its report that the SSMEs "did not cause or contribute" to the accident.[3]

Nevertheless, the day of the accident, in the face of grave circumstances, Hlass promised his people and the reporters gathered at NSTL, "We will be back!" From that moment on, a new journey for the NSTL began. Indeed, determined NSTL engineers and technicians set out "testing the way" as NASA began its "return-to-flight."[4]

The next decade at the Mississippi facility were years of growth and significant achievement. In 1989, the leadership of the facility passed from Jerry Hlass to his deputy director, Roy Estess, who was determined to carry on the tradition and take the installation to greater heights.[5]

Together, Hlass and Estess moved forward during the inspiring return-to-flight period and, after much hard work and diligence, they were rewarded when President Ronald Reagan honored Senator John Stennis by renaming the NSTL after him. The John C. Stennis Space Center was now elevated to the status of a full-fledged NASA center. Hlass, who served almost 13 years as manager and director, saw his plan to gain acceptance and trust become a reality by the end of 1988.[6]

---

2. Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996
3. William P. Rogers *et al.*, *Report Of The Presidential Commission On The Space Shuttle Challenger* (Washington, DC: U.S. Government Printing Office, 1986), pp. 19–21; Howard Benedick, *NASA: The Journey Continues* (Houston, TX: Pioneer Productions, Inc., 1989), p. 105.
4. "NSTL Joins Nation In Tribute To *Challenger* Crew," *Lagniappe*, February 1986, SSCHRC. Immediately following the *Challenger* disaster, reporters questioned the author about the possibility of one of the SSMEs that were tested at the NSTL causing the accident.
5. NASA-NSTL News Release, "Roy Estess Receives Presidential Rank Award, 13 May 1988, SSCHRC; Jerry Hlass to Executive Secretary, Incentive Awards Board, "1981 Honor Awards," 1981, SSCHRC.
6. John Seiley, interview by Rex S. Cooksey and Johnny Mann, *Way Station To Space*, video history, 25 October 1991.

Recovery And Revival

The *Challenger* accident produced a scenario of national leadership changes, new technical direction, and managerial restructuring within NASA that affected the destiny of the NSTL in a positive way. The accident, with all its destruction and depressive grief, was not unlike the devastating winds of change that swept across the Gulf Coast during Hurricane Camille in 1969. Camille's aftermath focused national attention on the area and the Mississippi Test Facility (MTF), which in turn prompted MTF manager Jackson Balch to observe that "it's an ill wind that blows no good."[7]

NASA's technical leaders at the time of the *Challenger* explosion were discussing, and actually leaning toward, cutting back on propulsion testing as an economic strategy. These leaders considered adopting a program, much like the automotive industry, which called for "spot-testing" engines, rather than continuing an aggressive certification and flight acceptance process. Many NSTL engineers said the successful Space Shuttle Main Propulsion Test program was the NSTL's "finest hour." At the same time, others emphatically stated that the record-breaking static-firing test program during NASA's return-to-flight program was the NSTL's greatest contribution to American spaceflight.[8]

NASA's nationwide return-to-flight program was a memorable team effort of enormous proportions. The effort involved all four spaceflight centers, the contractor organizations that participated in the Space Shuttle operations, and other NASA centers that contributed their unique expertise and specialized facilities to get NASA "flying" again. The first visible action, however, was seen at the NSTL, when testing resumed after almost five months.[9]

Immediately after the accident, the NSTL employees and residents of the surrounding communities joined in the national mourning. President Reagan,

---

7. See Chapters 7 and 8 of *Way Station to Space* for detailed information on Hurricane Camille.
8. See Chapter 11 of this book for good discussion of NSTL's "finest hour;" Gerald Smith, telephone interview by Mack Herring, 18 April 1996. Smith, former SSC deputy director, told the author in telephone conversation that the return-to-flight period after *Challenger* disaster was, in his opinion, the Agency's "finest hour." Boyce Mix, in an informal discussion with author, said he felt each NASA person involved with a particular test program had a different idea of "when" NASA's finest hour occurred.; Neil McAleer, Space Shuttle, The Renewed Promise (Washington, DC: NASA-PAM-521, 1988), pp. 5–6.
9. "NSTL Joins Nation In Tribute To *Challenger* Crew," *Lagniappe*, 20 February 1986, SSCHRC; Mack Herring, "*A Morning After...*" *Lagniappe*, 20 February 1986, SSCHRC.

who closely identified with NASA's "Operation Liftoff" and the "Teacher In Space Program," consoled and inspired fellow citizens with encouragement and support. The obviously shaken President, in his address to the nation on 28 January 1986, said, "We'll continue our quest in space. There will be more shuttle flights and more shuttle crews and, yes, more volunteers, more civilians, more teachers in space."[10]

The NSTL participated in an agencywide, closed-circuit, memorial service telecast from NASA's astronaut home base at the Johnson Space Center (JSC). During the NSTL portion of the memorial, Jerry Hlass addressed about 500 employees who crowded into the NSTL Visitors Center. Hlass, in his tribute to the *Challenger* crew, promised, "We will continue to reach out as they did. We will continue to explore because we must; we will go forward to keep their spirits and man's dream alive."[11]

Representative Trent Lott, who grew close to the NSTL NASA family throughout his many years in the Congress, spoke for people all over his south Mississippi district when he observed, "We are part of the family that has made the Space Shuttle program possible. We join NASA as it mourns the loss of these members of its family and will remember them for their bravery and quest for exploration."[12]

Many NASA employees found the experience after the *Challenger* accident similar to a death in their own family. In a true expression of sympathy, people in the local community stopped NASA employees at the grocery store, at church, or at a restaurant and quietly and sincerely extended their condolences and offered words of encouragement and support. The tragedy demonstrated the closeness between the NASA employees and their neighbors along the Gulf Coast.[13]

Immediately after the accident, there was a tremendous hue and cry from the American public, the media, and from old-line NASA professionals calling for changes in leadership within NASA—at the very highest level. One of the first asked to step down was Acting Administrator William R. Graham, in charge at the time of the accident. President Reagan then announced his intentions to nominate Dr. James C.

---

10. "NSTL Joins Nation . . . ," *Lagniappe*, SSCHRC.
11. Herring, "A Morning After," *Lagniappe*, SSCHRC.
12. "NSTL Joins Nation . . . ," *Lagniappe*, *SSCHRC*.
13. See Boyce Mix's observation on initial Space Shuttle launch in Chapter 11 of this book.

Fletcher, NASA Administrator from 1971–1977, to lead the Agency during its rebuilding phase.[14]

At the same time, NASA announced that Rear Admiral Richard Truly, Mississippi native and veteran astronaut, would serve in the critical role of Associate Administrator for Space Flight. Truly, at the time, was Commander, U.S. Naval Space Command. The most important facet of the new assignment for Truly was the need to direct the Agency's Data Analysis Task Force. The task force was collecting and analyzing information for a thorough review to determine potential causes of the *Challenger* accident. The task force closely paralleled the structure of the Presidential Commission, headed by former Secretary of State William P. Rogers. Truly asked James R. "J.R." Thompson, Jr., to serve as vice chairman of the Data Analysis Task Force. Truly's choice of Thompson was primarily in response to the fact that Thompson was formerly head of the SSME project at the Marshall Space Flight Center (MSFC). Robert Crippen, a NASA astronaut who flew on the first shuttle flight, was among the many other distinguished aerospace experts named to serve on the task force.[15]

These major appointments established an Agency hierarchy containing a cadre of top managers with intimate knowledge of the NSTL's capabilities. Fletcher had been Administrator when the NSTL (then known as the MTF) was going through structural upheavals. He was the person who finally recognized the south Mississippi installation as a separate field installation in June 1974. Fletcher had also appointed Jerry Hlass manager of the NSTL in 1976, and he was familiar with Roy Estess, when Estess served as chairman of the Agency's Equal Opportunity Counsel for three years.[16]

Thompson became extremely knowledgeable of the extensive and unique test capabilities at the NSTL. He made numerous trips to the installation and knew many of the test personnel on a personal basis. Thompson was also a

---

14. "NASA Warnings Claimed," *The (New Orleans, LA) Times-Picayune* (henceforth referred to as *The Times-Picayune*), 18 March 1986; Launius, *NASA: A History Of The U.S. Civil Space Program*, p. 115.
15. Sara Keegan, NASA Headquarters News Release, "NASA Task Force Assignments Detailed," 6 March 1986, NASA Historical Reference Collection (henceforth referred to as NHRC); "Agency Appoints Richard Truly To Head Space Shuttle Program," *Lagniappe*, 19 March 1986, SSCHRC.
16. NASA Headquarters Public Affairs Office (PAO), "Biographies of NASA Leaders, 1996, Http:\\www.hq.nasa.gov/officepao/History/history bios/htn1.; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996 and 26 March 1996, notes in SSCHRC; Roy Estess, interview by Mack Herring and Ms. Myron Webb, SSC, MS, 24 April 1996, notes and audio tapes in SSCHRC.

colleague and personal friend of Jerry Hlass, who assisted him in justifying and obtaining shuttle engine facilities when Hlass was director of NASA's Space Shuttle Facilities Division. These close associations and ties later paid off for the NSTL as NASA officials began to recognize the test expertise and technical capabilities at the south Mississippi site.[17]

Close acquaintances and friendships were forged during this period of NASA's history. Men and women bonded together in a determined effort to regain the reputation for excellence that the Agency enjoyed prior to the *Challenger* disaster. These relationships were especially important for the NSTL, an organization that was striving for recognition in response to its "can do" tradition of operation and its ability to test large propulsion systems. As others observed, the NASA organization, more than any other large governmental or private body, depended greatly on individual personalities to move important programs along—through the changing tides of space history.[18]

While the Rogers Commission hearings were under way, and the investigative work of the Data Analysis Task Force was in progress, all planned missions of the three remaining shuttles were suspended. Also, for several months all engine testing within the Agency was halted. The hiatus of engine testing, of course, included the prolific certification and flight acceptance testing of the SSMEs at the NSTL. Also postponed, and ultimately cancelled, was the planned higher level of thrust testing of the Main Propulsion Test Article (MPTA).[19]

Although over 6,000 people were involved in the Rogers Commission's four-month investigation, the daily criticism of the Agency took a heavy toll on NASA employee morale nationwide. The criticism was especially upsetting because, prior to the disaster, the Agency was considered by many as the most efficiently managed federal organization.[20]

In April 1986, Hlass again met with NASA civil service and contractor teams involved with the Space Shuttle program and made a sage prediction. The NSTL director said confidently, "With Dick Truly's conservative approach in getting the program operating safely and effectively, the best guess

---

17. NASA Headquarters PAO, "Biographies," p. 22, SSCHRC; Hlass, interview by Herring, 27 February 1996.
18. Keegan, "NASA Task Force..."; Estess, interview; Smith, telephone interview.
19. "NASA Postpones Mission," *Lagniappe*, 20 February 1986, SSCHRC; Marvin Lee "Marv" Carpenter, interview by Mack Herring, Pass Christian, MS, 25–26 March 1996; "Modifications Initiated to Create Third Test Position Here," *Lagniappe*, 20 November 1986, SSCHRC.
20. McAleer, *Space Shuttle, The Renewed Promise*.

in Washington is that testing will increase above the rate that was going on before." The positive-minded Hlass further asserted that the NSTL would be "busier than before," testing engines in preparation for a return-to- flight. Hlass then challenged the workforce to "rededicate [themselves]" to the standards of excellence to which they were accustomed, and get NASA back "where it was before" the ill-fated *Challenger* flight.[21]

The Rogers Commission sent its report to President Reagan and the nation on 6 June 1986. Referring to the *Challenger* explosion as an "accident rooted in history," Secretary Rogers reported that the terrible loss was caused by a "failure in the joint between the two lower segments of the right solid rocket motor." The report recommended a redesign of the faulty solid rocket motor joints, but also called for a review of NASA's management structure. Seven other recommendations for needed changes were made (1) review critical hardware and conduct hazard analysis; (2) examine the safety organization; (3) improve internal communications; (4) address landing safety; (5) provide better launch abort and crew escape; (6) review flight rate; and (7) ensure maintenance safeguards.[22]

The Commission's report was formally presented to President Reagan by Secretary Rogers at the White House. Administrator Fletcher commented on the Commission's findings when he pledged to ensure that the NASA program would "become as good as it ever was." Fletcher added, "We at NASA welcome the report. It was obviously time for a serious, thoughtful, constructive review of the Agency."[23]

The somber delivery of the Commission's report did, indeed, mark the beginning of a major overhaul of the civil space program and signaled a new era of unprecedented, record-breaking rocket testing at the NSTL. Although the SSMEs were cleared, the NASA Data Analysis Task Force recommended modifications on the SSMEs during the stand-down time. Additionally, the task force strongly recommended the engines be thoroughly tested before another shuttle flight took place.[24]

The first SSME static firing following the *Challenger* accident was on 26 June 1986. During the test, engine number 2106 was ignited for 1.5 seconds

21. "Director Jerry Hlass Speaks to NASA, Contractor Team," *Lagniappe*, 21 April 1986, SSCHRC.
22. Rogers, *Report On The Space Shuttle Challenger*, pp. 40, 198; See also McAleer's *Space Shuttle, The Renewed Promise*, p. 6.
23. "Fletcher Comments On Rogers Report," *Lagniappe*, 19 June 1986, SSCHRC; Mack Herring, "A Place of Beginning," *Lagniappe*, commentary, 19 June 1986, SSCHRC.
24. *Ibid.*; "Fletcher Comments...," *Lagniappe*, SSCHRC.

on the NSTL A-2 test stand. Although the firing was just "a blink and a puff," the test received nationwide media attention as the first visible activity by NASA since the January shuttle accident. The short firing, the first in a series leading to a full-duration static test of 520 seconds on 25 July, was a demonstration to the waiting American public that NASA had not lost its nerve and was beginning its journey back into space.[25]

In 1987 and 1988, static firings of the SSMEs reached an all-time peak with a record firing of 1,040 seconds, the longest shuttle engine test ever conducted. Later, two test-firings were performed for an unbelievable 2,017 seconds each, just weeks before the Space Shuttle *Discovery* launch in 1988. L. Boyce Mix, NASA's SSME test manager, said the 1987–88 firings were considered "daring" during the crucial return-to-flight testing period. A failure during these long-duration life-cycle tests could have caused cautious managers to postpone the scheduled return-to-flight launch of Space Shuttle *Discovery* on 29 September 1988.[26]

The White Paper

Perhaps inspired by the invigorated agencywide attitude and the determined effort of the NSTL test and support teams, a group of NASA engineers, led by Roy Estess, drafted a document that became known as the "White Paper." The document proposed that the NSTL be rededicated as a national center for propulsion testing. The plan suggested that an independent, NASA-managed, contractor-operated test team be installed at the NSTL to provide NASA with a continuing capability to test large propulsion systems. Pointing out that the well-known MSFC test laboratory was dismantled, the White Paper said that NASA was dependent on the engine- and vehicle-hardware contractors to test the large propulsion systems being manufactured.[27]

The major "question" posed by the NSTL-generated White Paper was "whether NASA should commit to third-party testing" of engine hardware.

---

25. NASA-SSC, Test and Engineering Directorate, "B-1 Test History," 21 December 1994, p. 1, SSCHRC; Mix, interview by Herring, 9 April 1996.

26. *Ibid.*

27. Roy Estess, Harry Guin, A.J. "Jack" Rogers, Jr., Harry Johnstone, and Bob Bush, "White Paper on Strengthening of Ground Test Capability for Large Propulsion Systems," 10 July 1986, SSCHRC.

Also advocated was NASA's return to a more active role and a strong commitment to a ground-test capability centered around very large government-owned facilities that taxpayers had invested in, such as the NSTL. The paper pointed out weaknesses in the present system (1986) where the hardware contractors controlled the testing and data-gathering process of their own products. Also noted was the substantial cost-saving merits of a centralized, continuing, propulsion test capability.[28]

The White Paper, drafted by Estess with the assistance of Harry Guin, A.J. "Jack" Rogers, Jr., Bob Bush, and Harry Johnstone, proved to be the NSTL's guide in the long-range pursuit to gain acceptance as the Agency's Center of Excellence for testing large propulsion systems. Although von Braun stated a similar policy in 1966, his vision of the installation as a national center for propulsion testing was eroded in the intervening years by internal politics between government and contractor managers.[29]

The NSTL group presented the White Paper on 10 July 1986 to the Crippen Group during a visit to the Michoud Assembly Facility in eastern New Orleans. The Crippen Group's primary focus was to ensure implementation of the Rogers Commission's recommendations, with an eye on improving internal NASA and contractor management structures and operating procedures.[30]

The NSTL employees who drafted the document were involved in testing the large propulsion systems since the very beginning of the Apollo program in 1966, and they were especially knowledgeable about the capabilities of the NSTL. Furthermore, all the engineers were in key leadership positions at the south Mississippi facility, which enabled them to help shape the NSTL's destiny.[31]

---

28. *Ibid.*
29. *Ibid.*; Wernher von Braun to George Alexander, *Aviation Week*, "In answer to questions," 23 December 1966, SSCHRC.
30. Estess et al., "White Paper on Strengthening...."
31. *Ibid.*; It is interesting to note that all of the authors of the White Paper were engineers who worked together for years, most as far back as the mid-1960s. Roy Estess recalls actually writing the paper, but he is quick to point out that he received strong input from his engineering associates. As pointed out earlier in the text, engineering schools in the immediate southeastern United States were heavy contributors to the MTF construction and test program. For instance, Estess was a graduate of Mississippi State. Guin finished at Alabama, Rogers had an engineering degree from Ole Miss, Johnstone from the tough engineering school at Auburn, and Bush matriculated from Georgia Tech. The author would have to surmise that these men brought a strong, diverse southern engineering education to bear in planning and drafting the White Paper.

On 18 July 1986, during the restructuring period following the *Challenger* accident, NSTL Director Hlass issued a contract to Bechtel National, Inc., for "consulting services" to help with plans related to future propulsion projects. Thompson, who was a key advisor to the NASA task force studying the *Challenger* accident, was the principal advisor for Bechtel. As a result, Thompson developed the preliminary test complex layout, identified potential locations for new test stands, and, more significantly, helped plan a strategy for future test activities.[32]

In a curious turn of events, Thompson was appointed director of the MSFC, effective 29 September 1986. With Thompson's appointment, there came an era of mutual respect and cooperation between the MSFC and the NSTL. This period of "good will" between the two centers is a perfect example of the unusual influence individual managers have had within the NASA organizational structure.[33]

Another fortuitous event occurred on 3 October 1986 when Admiral Richard Truly appointed Roy Estess to chair the review team of the Office of Space Flight's Shuttle Processing Contract. No doubt Truly heard of Estess's abilities from Thompson and Crippen and wanted to draw on Estess's expertise to study concerns raised by the Rogers Commission, the Crippen Group, and the congressional committees investigating the *Challenger* accident. Estess spent more than four months working closely with Crippen; Walter Williams, former director of Project Mercury and assistant to Truly on the task force; Lieutenant General Forrest S. McCartney, KSC director; and many other high-ranking NASA and contractor managers located across the country who were involved in the Space Shuttle program.[34]

In February 1987, at the review conclusion, Estess presented the team's findings to Truly. The review contained the team's (1) assessment of the KSC's shuttle processing arrangements at the time of the accident; (2) examination of relationships between shuttle processing contractors and the flight hardware

---

32. Contract, Pan American World Services, 18 July 1986, SSCHRC; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 29 March 1996.
33. NASA Headquarters, Biography, J.R. Thompson, History Office, http://hq.nasa.gov/office/pao/Biographies/thompson.html, 2 May 1996; Peter Cobun, "J.R. Thompson: Marshall Chief Runs Center The Way He Runs His Condo," *The Huntsville (AL) Times*, 27 November 1988; Hlass, interview, 29 March 1996; Roy Estess, interview by Mack Herring and Ms. Myron Webb, 24 April 1996.
34. NASA-SSC PAO, Biographies, Roy S. Estess, 8 July 1992 and 19 March 1996, SSCHRC; Sarah Keegan, NASA Headquarters News Release, "NASA Task Force Assignments Detailed," 6 March 1986, NHRC.

contractors; and (3) recommendations for improvements in the processing of future shuttles. The team review was valuable to Truly in his task of implementing the findings of the Rogers Commission and in making needed improvements in the shuttle management program. The diligent work of Estess as chair of the review team, however, proved especially important to the NSTL quest for recognition in propulsion testing. As a member of the review team, Estess was a credible ambassador for the NSTL, demonstrating his own talents to influential NASA managers.[35]

On 29 September 1986, Thompson took over the MSFC reins. Almost immediately, Hlass arranged a meeting with him in Huntsville to "explore future roles for [the] NSTL in propulsion testing." Several NSTL and MSFC engineers participated in the discussions on 20 October 1986. Thompson encouraged the NSTL team to continue their pursuit of future test programs, especially in securing a role in testing solid rocket motors and advanced liquid rocket motors. He also heartily agreed that the NSTL should be designated "a center of excellence for testing large propulsion systems." The savvy Thompson acknowledged that the MSFC and the NSTL shared "political strengths." The MSFC director recognized that the NSTL was backed by a strong congressional delegation of intelligent, influential, and supportive political leaders: Senator John C. Stennis, Senator Thad Cochran, and Representative Trent Lott. Stennis, of course, was nearing the peak of his power in the Senate, while Republicans Cochran and Lott had grown in favor with Ronald Reagan, who was then serving in his second term as the Republican President.[36]

Two other events occurred that further steered the installation on its course toward recognition as NASA's Center of Excellence for Propulsion Testing. On 22 October 1986, Truly visited the NSTL to chair a meeting of the NASA Management Council and participate in the annual Honor Awards Ceremony. During a meeting with Hlass and members of his senior staff, Truly surprised everyone when he suggested that the NSTL should "actively pursue the testing of [Advanced Solid Rocket Motors (ASRMs)]." At the time, only Joel Estes, a NASA engineer, had suggested the possibility of the

35. Roy S. Estess, report, NASA Headquarters Office of Space Flight, Shuttle Processing Contract Review Team, 9 February 1987, SSCHRC.

36. NASA Headquarters, Biography, James R. Thompson, Jr.; Hlass, interview; "Sen. Trent Lott Biography," SSC PAO Biography File, SSCHRC; "Sen. Thad Cochran Biography," SSC PAO Biography File, SSCHRC.

NSTL testing ASRMs at the Mississippi site. After all, the existing NSTL test facilities were designed to test liquid-propulsion engines and rocket stages. Truly's suggestion led to a long campaign to establish the NSTL as a testing facility for the improved and more powerful ASRMs.[37]

Meanwhile, on 1 November 1986, construction crews began working on the B-1 position (west side) of the big, B-1/B-2 dual-position test stand to modify the giant structure for the testing of SSMEs. After completing the modifications, the B-1 position, originally completed in 1967 to static fire the huge Boeing S-IC rocket-booster stage, provided a third position to static fire SSMEs.[38]

The momentous events of 1986 reshaped the future path of the NSTL, putting the installation back on course to having the south Mississippi facility recognized as the national rocket propulsion test center. The MTF had served well during the Apollo program and undergone significant changes during the 1970s as a unique, multiagency space and environmental complex. The *Challenger* accident rocked the entire Agency, causing it to engage in serious soul searching about its approach to many technical and managerial matters. Not the least of these was NASA's commitment to a vigorous rocket-testing program. In fact, the Agency's top management called for a return to the "old way" which was so successful for NASA during the Apollo program. The old way included testing rocket engines and stages to the point that NASA was "99.9 percent" certain that its rockets would fly safely once they were sent to the launch pad.[39]

Following the *Challenger* disaster, the renewed emphasis by Headquarters on testing was, of course, most beneficial to the NSTL's future. Thompson insisted that the SSMEs be tested at the NSTL, and that they be tested to the limit of their operating capacity. Members of the media construed this revived

---

37. Hlass, interview. Admiral Truly spent a full day at the NSTL on 22 October 1986 addressing employees at Honor Awards Ceremony and joining them at a traditional picnic at the Cypress House recreation park by the Pearl River. Truly also met with the NSTL senior staff at the new conference center, at which time he surprised most staffers by bringing up the possibility of testing an "improved solid rocket motor." Hlass voiced his concerns about testing "solids" at that meeting.

38. NASA SSC News Release, "Third Test Position Underway At NSTL," 14 November 1986, SSCHRC.

39. "NASA Administrator Visits NSTL; Presents Major Agency Awards," *Lagniappe*, 21 March 1988, SSCHRC; NASA-SSC News Release, "First Firing Set On New SSME Test Position," 24 March 1988, SSCHRC; NASA-SSC News Release, "2,017 Second Test Conducted on B-1," 4 August 1988, SSCHRC; "Shuttle Rocket Passes Test With Flying Colors," *The Times-Picayune*, 24 December 1987; Howard Benedict, *NASA: The Journey Continues* (Houston: Pioneer Publications, Inc., 1989), p. 109; Roger E. Bilstein, *Stages To Saturn. A Technological History Of The Apollo/Saturn V Vehicles* (Washington, DC: NASA SP-4206, 1980), p. 347; Erik Bergaust, *Wernher von Braun* (NY: Cobb/Dunlop Publishing Services, Inc., 1979), pp. 510–511.

philosophy to mean "test to destruction." In effect, the engines never reached such a point, even on the two static firings that exceeded 2,000 seconds.[40]

A Matter Of State

During the mid- to late 1980s, the NSTL propulsion engineers were not the only personnel enjoying the booming activities at the south Mississippi facility. True, the test stands were being used to their fullest capacities in support of the Space Shuttle's "return-to-flight." But other activities, such as the installation's involvement in the Agency's new commercial applications enterprises and technology transfer programs, began to enjoy unusual successes. Most notable was the State of Mississippi's unprecedented commitment to build a $4 million Technology Transfer Center in the heart of the facility and donate the building to NASA.[41]

The "bold" $4 million commitment had its roots in 1985 at a small meeting held at the onsite Rouchon House. State Representative Margaret "Wootsie" Tate of Picayune and Mississippi Research and Development Center Director James "Jim" Meredith met with Roy Estess to discuss ways the state could better capitalize on the technologies developed at the NSTL. The discussion was directed at proposals that Meredith developed for the new Mississippi Governor, William "Bill" Allain, who was searching for meaningful programs to promote during his term of office. Among the plans discussed were the support of satellite "spin-off" industries, development of the technology transfer program, and the location of a technology transfer center at the NSTL.[42]

Estess, who served as the "unofficial" state liaison officer for the NSTL since his appointment as deputy director in 1980, suggested to Tate and Meredith that ventures such as satellite business concerns were not successful in the past due to a number of factors. The lack of success of the ventures

40. "Shuttle Rocket Passes Test . . . ," *The Times-Picayune;* John Maines, "Two Years After Challenger, Lab Is Ready To Go," *The Jackson (MS) Clarion-Ledger* (henceforth referred to as *The Clarion-Ledger*), 28 January 1988. Deputy Director Roy Estess, in a highly optimistic mood, commented to *The Clarion-Ledger*, "We are a high-spirited team. We are confident we are on the right track. I think we will continue [testing] at a high rate."
41. "NSTL Approved For Technology Transfer Center," *Lagniappe*, 19 April 1985, SSCHRC.
42. Estess, interview by Herring and Webb, 24 April 1996.

involved the heavy emphasis on prime and support contractor use at the installation and the nature of the rocket-testing business, which relied heavily on specialized contractors with offices at other locations. Estess suggested the state pursue the location of a building on the site to enable Mississippi citizens to capitalize on the many varied technologies developed by NASA and the resident agencies. The building would provide much needed office and laboratory space for new enterprises, and, Estess pointed out, employment opportunities for high-tech personnel.[43]

At that time, in 1985, NASA's popularity was near an all-time high, with an overall approval rating in the national polls of 81 percent. Mississippi's "official" presence either in university research or technology transfer activities initially dated back to 1968 with the opening of an office onsite, when the NSTL was still known as the Mississippi Test Facility (MTF). A State Liaison and Coordinating Office was later located at the MTF in 1971 under an executive order signed by Governor John Bell Williams. Dr. Talmadge "Tal" Bankston, who headed the office, was a close associate and friend of former MTF Manager Jackson Balch. Bankston used every opportunity to promote state participation at the installation. In addition, Bankston had the ear of long-time NSTL supporter Herman Glazier, who served as executive assistant to seven Mississippi Governors, dating back to Governor Ross Barnett. Governor Bill Allain, who took office in January 1986, was also supportive of the idea and, of course, the planners knew they could count on a strong Mississippi Gulf Coast legislative delegation to push the project.[44]

Other factors providing encouragement for the development of the Technology Transfer Center at the NSTL included NASA's desire to make itself known throughout the state by way of its education outreach program. Since inception, the NSTL favored the idea of a Technology Transfer Center and promoted the idea by placing study contracts and grants with Mississippi colleges and universities. The expertise of the NSTL was well known at the Mississippi R&D Center and the Institute of Higher Learning. Economic promoters such as Leo Seal, Jr., former president of the Mississippi Economic

---

43. *Ibid.*

44. "Center Honors Herman Glazier," *Lagniappe*, 18 November 1988, SSCHRC; George Schloegel, interview by Mack Herring, Hancock Bank, Gulfport, MS, 21 February 1996.

Council, also supported the establishment of the center. In fact, George Schloegel, employed by the Hancock Bank and member of the Board of Economic Development, was one of the prime strategists promoting the Technology Transfer Center.[45]

Most supporters of the Technology Transfer Center saw the project as a "team" effort, with businessmen, political leaders, and government people working together. The establishment of the center was an unusual success, as few state governments build multimillion dollar facilities on federal property. Upon completion, the Technology Transfer Center building automatically became the property of the federal government and was placed in the care of NASA. Many at NASA Headquarters did not believe that a relatively poor state like Mississippi would take such a bold initiative. In fact, when informed of the undertaking, NASA Administrator James Beggs said "Why would Mississippi want to do that (build the center on NASA property), when it could better use the $4 million to fund grants to educate engineers?" Roy Estess, a native Mississippian who strongly advocated the project, answered Beggs, "We have been educating engineers for years and sending them off to other states to work. Maybe the Technology Transfer Center will keep some at home!"[46]

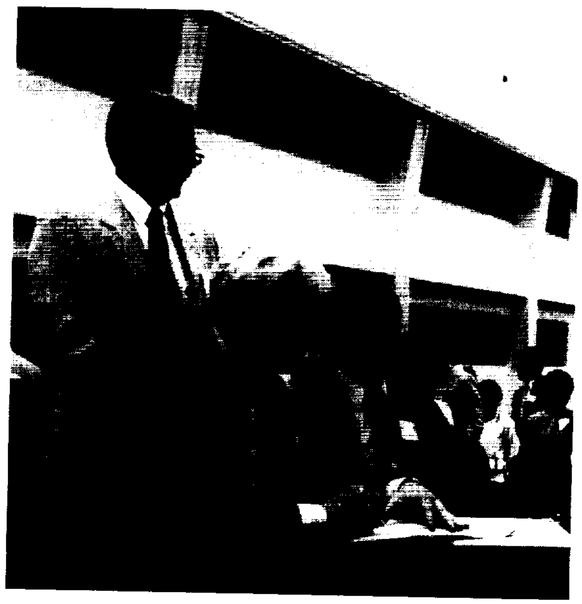
After some legislative ups and downs during the spring of 1985, the center was approved by the Mississippi Senate. The bill was signed by Governor Allain, with south Mississippi state legislators Gene Taylor, Bay St. Louis; Margaret Tate, Picayune; Curtis Holston, Poplarville; Walter Phillips Bay St. Louis; and Martin Smith, Poplarville, present for the signing ceremony. These south Mississippi lawmakers led the campaign to obtain the Technology Transfer Center at the NSTL. In addition to the hard work by the legislators, the project would have never reached fruition without the

---

45. "Dedication Of Technology Transfer Center Historic For Mississippi And NASA," *Lagniappe*, 19 June 1987, SSCHRC; James "Jim" Meredith, SSC, MS, telephone interview by Mack Herring, 20 May 1996. Jim Meredith told author that the Technology Transfer Center was an "enormous" team effort by Mississippi politicians, business people, and NASA personnel. Jim said that Governor Bill Allain backed the project 100 percent. State legislators Margaret "Wootsie" Tate, Gene Taylor, Walter Phillips, Curtis Holston, Martin Smith, and Jim Simpson played important roles in the campaign that eventually won acceptance of state lawmakers. The business community was led by Leo Seal, Jr.; George Schloegel; and Tommy Munroe. In addition, critical contributions came from Herman Glazier, the reliable and astute administrative assistant to several governors, including Governor Allain.
46. NASA-SSC News Release, "Technology Transfer Center Dedicated," 11 June 1987, SSCHRC; Meredith, interview by Herring, 20 May 1996; Estess, interview by Herring and Webb, 24 April 1996.

behind-the-scenes work of Herman Glazier, Tal Bankston, Jim Meredith, and Charles Deaton, chief of staff to Governor Allain.[47]

Without a doubt, the Mississippi Technology Transfer Center focused even more attention on the continuing progress at the NSTL. In fact, Admiral Truly was pleased to join Governor Allain, Jerry Hlass, and about 350 federal, state, and local dignitaries in dedicating the building on 11 June 1987.[48]



Mississippi Gov. Bill Allain signs an official order dedicating the Mississippi Technology Transfer Center at the National Space Technology Laboratories in 1987. Standing is NASA Administrator Rear Adm. Richard Truly, and seated is Jerry Hlass, director of the Stennis Space Center. (87-334-17)

At the ceremony, an obviously proud Truly pledged NASA's support for the new center, the only state enterprise of its kind in the NASA system. Governor Allain's remarks summed up the importance of the Technology Transfer Center when he said, "The fact that we had leaders in government, politics, business, and higher education on hand for the dedication marks the

47. Photo Caption, *Lagniappe*, 20 May 1985, SSCHRC; Meredith, interview; Estess, interview by Mack Herring and Ms. Myron Webb, 24 April 1996.

48. "Dedication Of Technology Transfer Center Historic For Mississippi and NASA," *Lagniappe*, SSCHRC. Dedication of Technology Transfer Center was major event in the history of technology in Mississippi. After the SSC ceremony, there was an informal reception at the Diamondhead Yacht Club, Diamondhead, MS, that was attended by state politicians, business people, and scientists, that went on into the late hours of the night. In attendance was Tal Bankston who had worked tirelessly, day and night, to push for full utilization by the state of the technology available at SSC.

beginning of a long-term partnership between the public and private sectors to provide necessary human and fiscal resources to the center." Allain also proudly proclaimed that the opening of the new building signaled the creation of 250 new jobs by federal and state agencies waiting to expand their programs at the NSTL.[49]

Over a year after the Technology Transfer Center was dedicated, a conference suite in the building was dedicated to Herman Glazier, a strong supporter of NASA since the early years of the test facility's location in Mississippi. Glazier worked closely with Governors Ross Barnett; Paul B. Johnson, Jr.; John Bell Williams; William Waller; Cliff Finch; William Winter; and Bill Allain. At the dedication of the conference suite, NSTL Deputy Director Roy Estess said, "Herman Glazier's strategic thinking and tactical legislative wisdom were critical in ultimately obtaining both state legislative and U.S. congressional approval for the center."[50]

Bold New Programs

The years of hard work and meticulous planning by Jerry Hlass and his staff also began to pay off big dividends in other areas of endeavor. In 1988, the facility was rewarded with major national programs involving testing of new and larger propulsion systems. The Space Shuttle test program continued at a record pace with the rolling thunder of the engines echoing across south Mississippi three to four times a week. These rocket tests were aimed at improving the main engines, ensuring their readiness for NASA's return-to-flight. Hlass and his experienced staff became deeply engrossed in planning for future testing involving heavy lift engines for an Advanced Launch System (ALS) project, the improved and more powerful ASRM, and the early development of components for the National Aerospace Plane (NASP) proposed by President Reagan.[51]

---

49. *Ibid.*
50. NASA-SSC News Release, "Herman Glazier Honored At NASA's John C. Stennis Space Center," 31 October 1988, SSCHRC.
51. NASA-SSC Briefing Paper, "The Stennis Space Center, Reinventing Government For 25 Years," 14 September 1995, SSCHRC; The dedication of the Mississippi Technology Transfer Center offers an excellent example of the combined commitment of Jerry Hlass and Roy Estess to strengthening NASA relationships with federal and state resident agencies.

NASA Administrator Fletcher came to the NSTL on 10 March 1988 to compliment the progress of the NASA-contractor team and to view a static firing. Following the engine test, Fletcher delivered a very upbeat address at the Honor Awards Ceremony during which he praised the accomplishments of the NSTL team. He said, "Building on the foundation of our past accomplishments, our unique rocket-test facilities, the special talent and expertise of our government-contractor workforce, and state-of-the-art support laboratories, there is no limit to the progress and contributions we can make at [the] NSTL." Fletcher further commended the NSTL team for performing a "first-rate job for NASA's return-to-flight program."[52]



Dr. James C. Fletcher, NASA Administrator, reacts to a 110-decibel roar emitted during a 520-second test firing of a Space Shuttle Main Engine at Stennis Space Center on 10 March 1988. From left, Roy Estess, National Space Technology Laboratories (NSTL) deputy director; Boyce Mix, Marshall Space Flight Center (MSFC) resident SSME manager at NSTL; Fletcher; Joe Lombardo, MSFC Space Shuttle Main Engine (SSME) program manager; and Jerry Hlass, NSTL director. (SSC-88-150-20)

Fletcher then awarded the prestigious Exceptional Service Medal to Harry Guin for his contributions in support of propulsion test activities, and to Chief Counsel Ken Human for his contributions to a wide range of activities, including legal counsel and labor relations. Fletcher also presented a Public Service Group Achievement Award to Pan American's B-1 project team for "outstanding professionalism" in the timely completion of the B-1 construction project that gave NSTL a third test position to support the busy SSME test program.[53]

The next big break for the small, but tenacious, NSTL propulsion crew came during an announcement by Senator John C. Stennis on 11 March. Stennis, Chairman of the Senate Appropriations Committee and President Pro Tempore of the Senate, announced that an agreement between the Air Force and NASA would place the NSTL in a lead role in developing a new space vehicle for civilian and military needs.[54]

Stennis said the agreement called for the NSTL to assemble and test all completed engines that were part of the Air Force's ALS project. The project called for modifying existing facilities at the NSTL and the construction of additional structures. The influential Mississippi Senator said he was pleased to announce that the work would create 400–500 construction jobs at the NSTL. Stennis also predicted that an additional 1,000 permanent jobs would be created at the "fully utilized" installation within 10 years. Funding for the project, Stennis said, would be "about $300 million over the next six- or seven-year period." A most important aspect of the plan was the involvement of the military in testing engines for the first time at the NSTL. According to the Senator, the testing of military systems, as well as NASA's civilian products, was the very best of both worlds.[55]

---

52. "NASA Administrator Visits NSTL... ."
53. NASA-SSC Propulsion Test Directorate, "A-1, A-2, B-1 Test History," 22 December 1994, SSCHRC; Hlass, interview.
54. *Ibid.* According to Senator Stennis "[The] NSTL is in an excellent position to perform the crucial testing on these engines for the military as well as for NASA. Our country's best interests will be served by involving the Mississippi facility in the developing and testing of this new engine [for the ALS program]. It makes good sense to use these facilities to the maximum and also to prevent costly duplication of rocket test facilities at military sites elsewhere, when they already exist in Mississippi [at the NSTL].": The Office of Senator John C. Stennis, News Release, 11 March 1988, SSCHRC.
55. NASA-SSC News Release, 11 March 1988, SSCHRC; Senator John C. Stennis, *Report To Mississippians*, "Space Exploration Must Move Forward," *The (Bay St. Louis, MS) Sea Coast Echo*, 27 December 1987. Sen. Stennis took the opportunity to write his monthly newspaper column, entitled "Report To Mississippians," about the importance of the national space program and the need for the nation to support the development of a space station.

Stennis stressed that a new "military" dimension to the NSTL testing activity was testimony to the "outstanding capabilities and record of achievement" the facility had earned in the past. NASA Headquarters' officials listened intently to Stennis at the time, because he had just issued a declaration to support NASA's return-to-flight program and the Agency's embattled Space Station program. Many Headquarters' officials knew that in his monthly "Report to Mississippians," Stennis had written, "The next logical step in space exploration is the establishment of a permanent Space Station that will assure world leadership in space for our country in the 1990s and beyond." NASA Administrator Fletcher later commented that Stennis's support of the Space Station in the spring of 1988 "saved the program."[56]

The importance of the ALS decision in 1988 was far-reaching. Stennis's support of the project was a milestone for the NSTL's continued march toward becoming a Center of Excellence for Propulsion Testing. Understandably, the NSTL wanted to be the Center of Excellence for "all rocket systems" developed in the country, civilian and military, and not just engines and systems developed for NASA. The ALS project included a much needed Component Test Facility that would provide the south Mississippi installation with the capability to be a "full-service" test facility.[57]

In July 1988, the Stennis Space Center, (SSC) formerly the NSTL, was selected to conduct another testing project that also promised great rewards for the facility. The selection of the SSC on 26 July 1988 for testing the proposed ASRM meant that the new center would be the site for static firing all propulsion systems on the Space Shuttle. The announcement that SSC was selected, however, was not altogether "good news." Hlass and his people had their hearts set on manufacturing, as well as testing, the new and improved motors that were to replace the solid rockets that had failed during the flight of the *Challenger* in January 1986. The selection of the SSC as the test location for the ASRM brought 600 permanent jobs to the area, about 200 employees at the SSC, and an additional 400 workers at the Michoud plant and the Slidell Computer Complex. This new mission, however, later brought

---

56. NASA-SSC News Release, 11 March 1988, SSCHRC; Stennis, "*Report To Mississippians. . .*"

57. NASA-SSC History Office, "Pursuit Of A Propulsion Test Mission For The NASA John C. Stennis Space Center," January 1991, SSCHRC; "NASA Selects SSC For ASRM Testing," *Lagniappe*, 29 August 1988, SSCHRC.

environmental protests and community problems—situations the center had never encountered. Earlier, Hlass stated that he did not want to contend with potential environmental problems if the center did not get the full employment boost, which would have included approximately 1,400 manufacturing jobs for the SSC. Nevertheless, the ASRM project focused even more national attention on the propulsion role of SSC.[58]

In Honor Of Stennis

An announcement that Senator Stennis would be retiring from the Senate in January 1989 set the stage for a series of major events honoring the statesman from Mississippi who had contributed so much to his country, to his state, and to the Space Agency. Not the least of these honors came in May 1988 when President Reagan renamed the NSTL in honor of Senator Stennis. In March, Senator Thad Cochran, the Republican Senator from Mississippi and a close friend of Stennis, introduced legislation in the Senate to rename the NSTL in honor of Senator Stennis. Cochran told his colleagues in the Senate, "As chairman of the Armed Services Committee and, more recently, as chairman of the Appropriations Committee, Senator Stennis has been in positions that have enabled him to be a strong influence in the authorization and funding of these important [NASA] programs."[59]

About the same time, NASA Administrator Fletcher also recommended to President Reagan that the NSTL be named for Stennis. In addition, earlier private discussions between Hlass and Eph Cresswell, Stennis's long-time assistant and friend, had focused on recognizing Stennis for his dedicated support of NASA and the south Mississippi facility. During talks between Hlass and Cresswell, the renaming of NSTL was discussed. Roy Estess, Mack Herring, and Wanda Howard Hlass's administrative assistant, assisted Hlass in crafting a paper for Fletcher to forward to the President. No doubt Senator Cochran's strong devotion to his friend and colleague along with Fletcher's recommendation to the President, and the behind-the-scenes work of Hlass,

58. *Ibid.*
59. "NSTL Bill To Honor Stennis," *The Clarion-Ledger*, 26 March 1988; Linda Slade, telephone interview by Mack Herring, SSC, MS, 22 May 1996.

Cresswell, and his staff, all contributed to Reagan's action to rename the facility in honor of the man who contributed so much to America's unrelenting quest to build a strong military and win the Cold War.[60]

While Senator Cochran's legislation was working its way through the Congress, Reagan decided to go ahead and rename the NSTL. On 20 May 1988, President Reagan signed the Executive Order that renamed the NSTL the "John C. Stennis Space Center." The order stated that Stennis had "steadfastly" supported the space program since its inception. The presidential order cited Stennis for his "visionary leadership" to ensure world leadership and preeminence in space for the United States. Reagan also said that Stennis's "unwavering support" of the south Mississippi facility from the moment of the decision to establish the installation was "a fact well-known by NASA officials in all of their dealings with Stennis and his staff."[61]



One of the proudest days in the history of the installation came 3 August 1988 when the south Mississippi facility was dedicated the John C. Stennis Space Center (SSC) in honor of Sen. Stennis. Pictured are, left to right, Toni Seawright, Miss Mississippi 1987; Rear Adm. Richard Truly, NASA associate administrator for Space Flight; Gov. Ray Mabus; Jerry Hlass, SSC director; Sen. Stennis; Dr. James C. Fletcher, NASA administrator; Sen. Thad Cochran; Rev. Beverly Tinnin; and Roy Estess, SSC deputy director. (SSC-88-471-19196)

60. Roy S. Estess, interview by Mack Herring and Ms. Myron Webb, 7 July 1995; Author's personal AMEX calendar notes, 1988, SSCHRC.

61. Ronald Reagan, Executive Order, "Designating Certain Facilities of the National Aeronautics And Space Administration In The State Of Mississippi As The John C. Stennis Space Center," The White House, 20 May 1988, copy in SSCHRC.

After the Executive Order was issued, Administrator Fletcher said: "This [renaming of NSTL] should have taken place a long time ago. John C. Stennis served as the father of NSTL since he led the efforts for its creation. His leadership of the nation's space program stands as a monument to his career of significant accomplishments." Jerry Hlass, who became the SSC's first director, stated that "he has been a leader and strong advocate for a prominent role in space for the United States." "Furthermore," according to Hlass, "his close association with the center has contributed significantly to the growth and progress we have experienced over the first 27 [years of the facility's existence]."[62]

NASA pulled out all the stops in its dedication of the newly renamed Stennis Space Center on 3 August 1988 with a ceremony on Stennis's 87th birthday. Upwards of 7,000 people gathered to honor Stennis at the outdoor dedication ceremony held in front of the main administration building in sweltering 99-degree south Mississippi summer sunshine. Immediately after the big event, thousands of well-wishers joined Senator Stennis in a gala birthday party held inside a 100-yard-long, air-conditioned, circus-type tent.[63]

"Pageantry, patriotism, and pride" were the themes of the dedication that featured speeches by Mississippi Governor Ray Mabus, Administrator James Fletcher, Admiral Richard Truly, Senator Thad Cochran, and Director Jerry Hlass. U.S. Representative Trent Lott led a long list of dignitaries, including State Senator Gene Taylor and State Representative Margaret Tate, who came to pay tribute to Stennis. Stennis's proud family was also well represented at the grand affair. Deputy Director Roy Estess, who was soon named the SSC director, served as master of ceremonies, which he later said was one of the most memorable events of his life. Senator Stennis, who smiled, laughed, and clapped his hands, gave a resounding and emotional response.[64]

Hlass praised the Senator for his "foresight and leadership" and Associate Administrator Admiral Truly remembered his childhood growing

---

62. "John C. Stennis Space Center—President Reagan Honors Senator Stennis; Changes Name of NSTL," *Lagniappe*, 20 May 1988, SSCHRC.

63. Nan Patton Ehrbright, "Stennis Life, Work Saluted, *The (Biloxi/Gulfport, MS) Sun-Herald* (henceforth referred to as *The Sun-Herald*), 4 August 1988; Official NASA Program, "Dedication, John C. Stennis Space Center," 3 August 1988.

64. Ehrbright, "Stennis Life, Work...," *The Sun-Herald*.

up in Mississippi and how he was influenced by Senator Stennis. Governor Mabus called Stennis a "man of vision" who had helped guide the country to conquer new frontiers. Senator Cochran thanked the senior Senator for his friendship and the example he set during his 41 years in the Senate. Fletcher referred to Stennis as the "founding father" of the center and said, "From its early beginning in the 1960s, this center has been Senator Stennis's center in all but the name. Today, it is only fitting and proper that it, in fact, bears his name." In response, Senator Stennis applauded the efforts of everyone who worked to build the center. "You made up your mind; you kept on track; you put out your own money; you gave your own time," Stennis said. Having his name on the center was incidental, Stennis declared, "It is the work being done that matters."[65]

The ceremony was concluded with a spectacular fly-over of 11 vintage and modern jet aircraft representing the numerous aircraft the Senator had helped acquire funding for through the years from World War II to the present. The U.S. Marine's Drum and Bugle Corps filled the air with patriotic music as the vintage airplanes motored by, and finally the powerful jets zoomed upward and disappeared, leaving only white contrails lazily fading in the bright, blue Mississippi sky.[66]

The SSC dedication was a personal tribute to the life's work of the Mississippi Senator. Hundreds of employees at the center volunteered to help prepare for the event, wanting to put their own mark on the event that honored their Senator. The dedication also demonstrated the appreciation that the community felt for Stennis's efforts to help establish and build the facility in Mississippi. NASA Headquarters officials, who depended on the senior statesman's support in budgetary battles, also pitched in to make the dedication one that Administrator Fletcher said was, "the best I have ever [attended]." The NASA Administrator added, "It will be many, many moons before Mississippi sees another event like this one."[67]

More important to the NASA family were Senator Stennis's own thoughts of the ceremony in his honor. He wrote to the NASA-contractor family at the SSC a few days after the event and said. . .

---

65. "NASA Dedicates John C. Stennis Space Center," *Lagniappe*, 29 August 1988, SSCHRC.
66. *Ibid.*
67. "Senator Stennis Honored At Dedication Of Center," *Picayune (MS) Item*, 4 August 1988; Ehrbright, "Stennis Life, Work...." *The Sun Herald*.

My own personal feelings of gratitude and joy defy description. The dedication of this facility brought back so many fond memories of the early days of struggle, when we had little more than potential and desire to develop a first-rate facility that would aid in the space program. The reality that is the Stennis Space Center has far exceeded our dreams of those early days. Now we stretch to dream bigger dreams which will also be attainable if we work with the same determination and desire. Thank you for making possible a day which will always stand as a high watermark in my public service career.[68]

The tribute to Stennis's lifetime of government service and tenacious support for the space program was fitting and even spectacular. The real importance of the renaming, however, came after the ceremony, when the SSC became a full-fledged member of the family of NASA field centers, and its director was able to sit at the NASA council tables as an equal with fellow center directors. The SSC's prominence and recognition spread quickly throughout the Agency, and a new level of status and accomplishment lay before the small, but dedicated NASA team. The dedication, as Stennis said at the ceremony, was also a tribute to the hard work and dedication of the NASA-SSC team. In a real sense, the President's renaming of the facility was also a tribute to the Stennis employees for their struggle "against all odds" that began nearly 20 years earlier when they set out to "save" their installation and gain independence as the Apollo program began to wind down.[69]

The Journey Continues

The long and highly successful tenure of SSC director Jerry Hlass did not end with the celebrated dedication of the new NASA center. On the night of the dedication ceremony, the Space Shuttle test team static-fired the SSME 2206 on the newly modified B-1 test position for 2,017 seconds, a record run for an

---

68. Mack Herring, "Dream Bigger Dreams," commentary, *Lagniappe*, 29 August 1988, SSCHRC. Senator Stennis used the expression "dream bigger dreams" in a letter to Jerry Hlass (and to all SSC personnel) thanking Hlass and the SSC employees for honoring him with the dedication. Stennis encouraged them to "dream bigger dreams." American author-poet Edgar Allan Poe also used the words in one of his poems.
69. "SSME Test Program Reaches Milestones," 29 August 1988.

SSME. The milestone test was equivalent to 34 minutes, or four Space Shuttle flights into space. The test team fired the SSME again on 15 August for 2,017 seconds. During one of these long-duration firings, approximately 600,000 gallons of liquid hydrogen and 230,000 of liquid oxygen were burned. Ten-million gallons of water were needed to cool the test stand's flame deflector.[70]

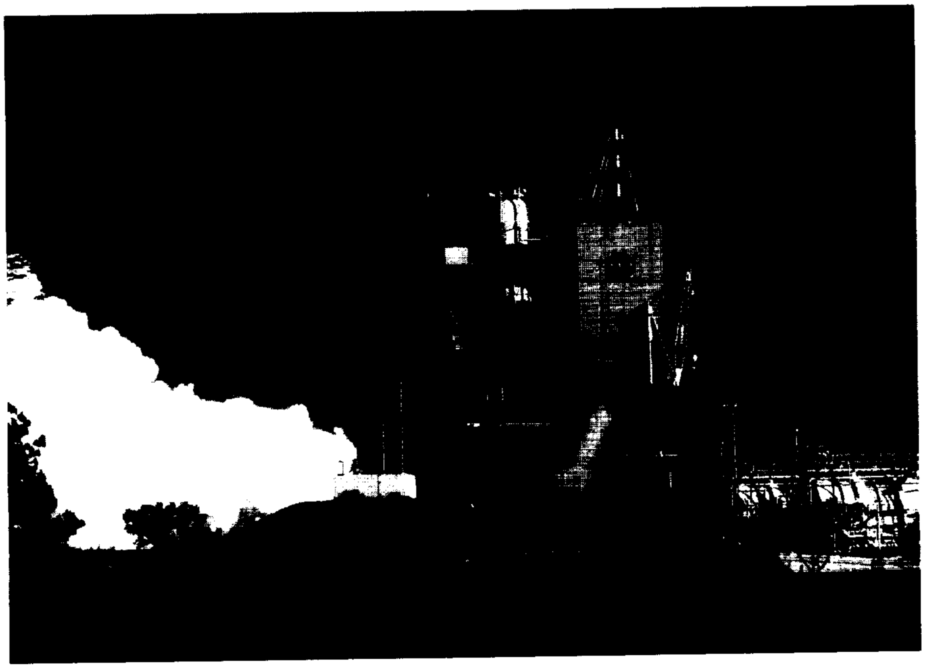
Boyce Mix, resident manager of the MSFC's Shuttle Projects Office, said the series was run to accomplish testing on the least number of occasions as possible to achieve the established "8,000 second [testing] goal." Mix said he was "pleased" with the performance of the engine, the test team, and all support systems. "Two-thousand seconds is a long time," he noted. "It takes a lot of concentration for test conductors to monitor everything in that period of time."[71]

As time neared for the 29 September 1988 launch of Space Shuttle *Discovery* on NASA's STS-26 return-to-flight mission, the enthusiasm of the SSC "can do" employees reached new heights. "It feels much like it did when we were leading up to the first shuttle launch of *Columbia* in 1981," Deputy Director Roy Estess observed. "We are an aggressive, high-spirited team, confident that we are on the right track." Roscoe Nicholson, a Rocketdyne engine test manager and head of the company's 320-member test team, echoed Estess's summation and added, "We're very happy with the way the engines are working." Estess and Nicholson agreed that problems discovered during the extensive testing—such as cracks, welding flaws, and a small heat exchanger—had been solved.[72]

With the successful testing of the shuttle's main engines, a major phase was completed in the process of preparing the Space Shuttle for flight. NASA certified that numerous improvements were made to the rocket's engines and they were ready to return-to-flight. All told, there were 40 changes made to the SSMEs during the 32-month, stand-down period. The last test firings, aimed at certifying the design modifications, were completed in July. The two record-breaking 2,017-second firings on the B-1 test stand in August gave the Agency even more confidence for the upcoming STS-26 shuttle launch.[73]

---

70. John Maines, "Two Years After *Challenger* Lab Is Ready To Go," *The Clarion-Ledger*, 28 January 1988.
71. "Shuttle Engine Improvements Certified Ready For Flight," *Lagniappe*, 21 September 1988, SSCHRC.
72. Estess, interview; Maines, "Two Years After Challenger...," *The Clarion-Ledger.*
73. "NASA Schedules Target Date For Shuttle *Discovery* Launch," *Lagniappe*, 21 September 1988, SSCHRC.



A cloud of hot steam boils out of the flame deflector at the A-1 test stand during a test firing of a Space Shuttle Main Engine in 1988 during the NASA "return-to-flight" program. (SSC-88-072-2)

Since SSME testing resumed in June 1986 following the *Challenger* disaster, the test program at the SSC accumulated 175 tests for a total of 79,775 seconds. Understandably, the large number of tests and the cumulative number of testing seconds undertaken were directly related to a desire to eradicate any problems with the engines prior to an extensive Office of Space Flight (OSF) review of the entire Space Shuttle system and engine flight-readiness certification. As a result, the accumulated firing time was equivalent to approximately 50 Space Shuttle missions.[74]

The meeting of NASA's five-member OSF Management Council, comprised of the four center directors and the NASA Headquarters's OSF director, took place at the SSC on 9 September 1988. The OSF meeting was preceded by a shuttle program management review on the Mississippi Gulf

74. *Ibid.*

Coast headed by Arnold Aldrich, director of the National Space Transportation System. Aldrich and his team then presented their findings to the OSF directors on 9 September. An announcement of a 29 September target date for the launch of the Space Shuttle *Discovery* was the Agency's return-to- flight. Members of the Space Flight Council were Rear Admiral Richard Truly, head of the Office of Space Flight; Jerry Hlass, SSC; Aaron Cohen, JSC; Forrest McCartney, KSC; and J.R. Thompson, Jr., MSFC.[75]

At the conclusion of the critical OSF meeting, Admiral Truly announced to the press that the Space Shuttle was again ready to fly. In making his proclamation, a jubilant and confident Truly praised the entire NASA organization's accomplishments in the return-to-flight program. The Mississippi native proudly recounted the testing done at the SSC when he said, "The work that has been done down here [at the SSC] has been the heaviest test program ever, and Stennis has done it," Truly said. "It's complete now, and we're ready to fly!"[76]

Of course the entire Agency was pleased to hear those encouraging words from Admiral Truly. None of the spaceflight directors was happier than Jerry Hlass, who led his "can do" team from the lowest ebb of their morale in 1976 to the exhilarating heights of becoming a full-fledged participant in NASA's return-to-flight campaign. Hlass, in nearly 13 years, moved from the back row of the OSF conference room to become a respected, voting member of the elite spaceflight directors' club, sitting as an equal at their table. Hlass admitted that Truly was largely responsible for the change in his status within NASA because when Truly was appointed as Associate Administrator following the *Challenger* explosion in 1986, the Admiral wanted all spaceflight centers to participate fully in the important decisions made to get the shuttle flying again. Truly believed active participation by all concerned was necessary to achieve the results needed to rebuild the organization, redesign and modify the hardware, test the components, and conduct a successful launch.[77]

---

75. NASA Headquarters News Release, "*Discovery* Launch Set For 29 September," 27 September 1988, NHRC; "NASA Schedules Target Date...," *Lagniappe*, 21 September 1988, SSCHRC.

76. *Ibid.*; Hlass personal notes, handwritten, 27 February 1996, original in SSCHRC; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996.

77. Hlass, interview; NASA-SSC History Office, Chronology, 1991, SSCHRC; "Successful *Discovery* Mission Tops News In 1988," *Sea Coast Echo*, 27 January 1989.

The entire NASA family was invigorated by Admiral Truly's announcement that the Agency was ready to go back into space with the *Discovery* orbiter on the STS-26 spaceflight mission. Personnel at the Stennis Center had been on an emotional high all during 1988, with one achievement after another.[78]

With these heady achievements tucked away, Hlass, several members of his staff, and a number of community friends headed to the KSC for the launch of *Discovery* on mission STS-26 on 29 September 1988. Personnel from the south Mississippi installation prepared the rocket stages for all of the Moon missions during the Apollo program and the engines for the first 25 Space Shuttle flights. The return-to-flight mission of *Discovery*, however, held special significance for all concerned. The launch of *Discovery* was considered a "comeback" mission to recover NASA's honor and credibility, qualities somewhat tarnished by the *Challenger* accident. For the SSC government-contractor team, the STS-26 return-to-flight mission was also special because of the monumental testing effort conducted in south Mississippi to ensure the safety and efficiency of the *Discovery*'s main engines.[79]

In addition to the work devoted to the STS-26 mission, the personable crew members of *Discovery* were especially close to many employees at the SSC because they had visited the test center in 1987, presented awards, shook hands, and signed autographs. During their visit, the crew met with as many employees as possible, including workers in the Space Shuttle Test Complex. The astronauts on the flight were Navy Captain Frederick H. "Rick" Hauck, commander; Air Force Colonel Richard O. "Dick" Covey, pilot; and mission specialists George D. "Pinky" Nelson, John M. "Mike" Lounge, and Marine Lieutenant Colonel David C. "Dave" Hilmers.[80]

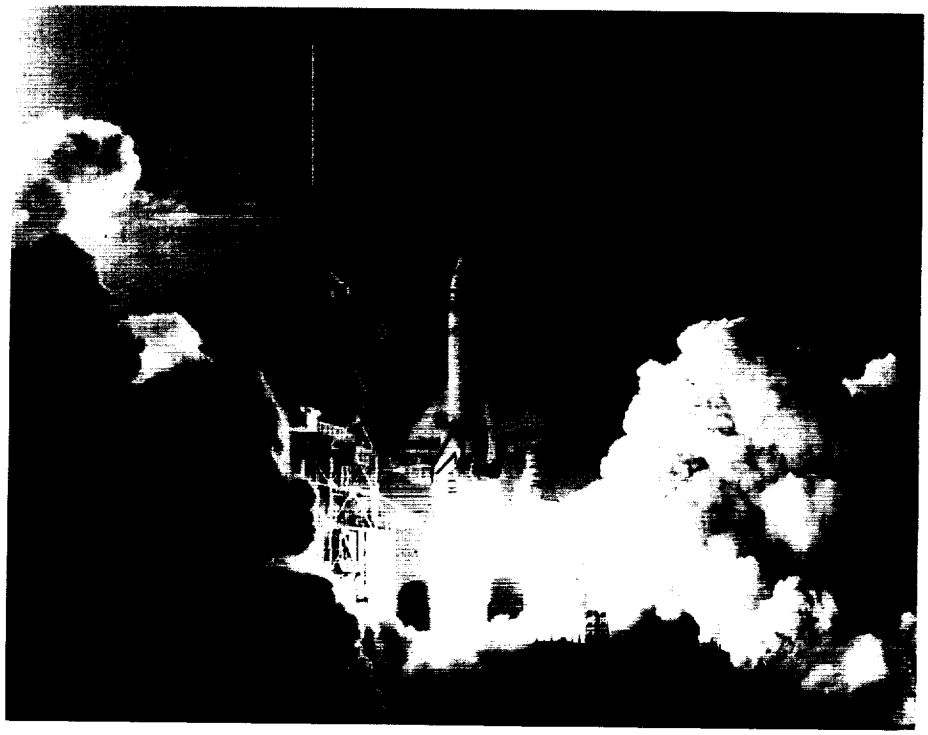
Beyond the SSC team's achievements in testing and their attachment to the crew, the STS-26 mission was a personal accomplishment for Jerry Hlass. The launch of *Discovery* marked the first time an SSC director actively participated in the decision process certifying a craft for flight. Hlass's opinion, along with the other spaceflight directors, was a contributing factor in making the "Go or No-Go" launch decision for the mission. A new spirit of teamwork prevailed under Admiral Truly's leadership of NASA. In addition, Hlass felt

---

78. *Ibid.*

79. *Ibid.*

80. *Ibid.*; Neil McAleer, *Space Shuttle, The Renewed Promise* (Washington, DC: NASA-PAM-521, 1988), pp. 2–6; "Flight Crew For STS-26 Visits NSTL: Presents Snoopys," *Lagniappe*, 20 March 1987.



The Space Shuttle Discovery (STS-26) was launched from Kennedy Space Center 29 September 1988, signifying America's return-to-flight following two years of down time as a result of the Challenger accident on 28 January 1986. Personnel at the National Space Technology Laboratories "tested the way" with record rocket engine tests prior to the STS-26 mission. (SSC-94-677-1)

close to the other center directors, Cohen, McCartney, and Thompson, having worked with them during the return-to-flight recovery period. With many of his employees and community friends present for the STS-26 launch, Hlass could not have been happier.[81]

Likewise, on 29 September 1988, NASA Headquarters's officials were excited at the prospect of a successful return-to-flight launch of Space Shuttle *Discovery*. At 11:37 a.m., *Discovery* lifted off the launch pad and quickly accelerated out of sight to the relieved applause and yells of approval of the

81. Hlass, interview.

tens of thousands of spectators who gathered to wish the crew and NASA well. As the craft climbed into the blue sky, many members of the launch control team were filled with emotion, some moved to tears.[82]

In addition to performing the scientific and engineering tasks, the STS-26 shuttle mission crew paused to pay tribute to their fallen comrades of Space Shuttle *Challenger*. Commander Rick Hauck added to the remarks made by the other members when he reflected, "Today up here where the blue sky turns to black, we can say at long last to Dick, Mike, Judy, to Ron and El and to Christa and Greg—Dear friends, we have resumed the journey that we promised to continue for you...your loss has meant that we could confidently begin anew...your spirit and your dreams are still alive in our hearts."[83]

On 3 October 1988, *Discovery* concluded the historic mission said to be "A great ending to the new beginning." A very proud and excited Admiral Truly hailed the mission as an "absolute stunning success." The conclusion was, indeed, as Administrator Fletcher proclaimed, "a banner day for NASA." President Ronald Reagan joyfully proclaimed that "America is back in space!"[84]

Crossing To Victory

Following the successful *Discovery* mission, the SSC employees shared in the adulation from fellow citizens. The SSC workers gave their best in long hours of testing the engines for the mission. Some SSC team members gave an extra measure by serving on investigative and review teams to improve manufacturing and processing and to ensure the safety and reliability of the vehicle. The Mississippi installation's engineers and technicians also made a significant and lasting contribution by developing a system to remotely monitor shuttle temperatures and icing conditions.[85]

This important shuttle-monitoring contribution came from the Science and Technology Laboratory (formerly the ERL), where Gerry Meeks and his

82. Benedict, *The Journey Continues...*, pp. 110–111; Roger D. Launius, NASA: A History Of The U.S. Civil Space Program (Malabar, FL: Kreiger Publishing Company, 1994), pp. 117–118.
83. *Ibid.*
84. "STS-26 Crew Thanks NSTL," *Lagniappe*, 24 October 1988, SSCHRC; Benedict, *The Journey Continues...*, pp. 108–111.
85. Jerry Hlass "Special Thanks To A Dedicated Team," *Lagniappe*, 24 October 1988, SSCHRC.

colleagues designed a system using remote sensing techniques that would not only monitor icing and temperature conditions of the vehicle, but would also detect hydrogen- or oxygen-fed fires, or propellant leaks. The innovation was first used during the STS-26 mission and is now used on all shuttle flights. At the time the monitor was unveiled, many engineers wondered "what if" the system had been available before the *Challenger* mishap.[86]

A very pleased Jerry Hlass thanked all the SSC employees for their efforts in helping prepare the *Discovery* for flight. The proud SSC director noted in an open letter to all employees that the dedicated SSC team "picked themselves up from extreme adversity" and helped the Agency achieve a stunning comeback. In his letter, Hlass noted the record-breaking testing of the main engines, the modification and activation of the B-1 test stand, the work on the review teams, and the development of the remote sensors to thermally map the shuttle stack as it stood on the pad at KSC.[87]

On 26 October 1988, the triumphant crew of the *Discovery* visited the SSC to personally thank those employees who tested the shuttle's engines and helped make the improvements leading up to the STS-26 mission. The crew's visit was like a "victory party" or a celebration. Once again the astronauts went all over the sprawling space center, cracking jokes, shaking hands, and sincerely expressing their appreciation to the SSC team. The *Discovery* crew shared photos with employees in the Visitors Center auditorium, talked to several hundred workers in the shops, visited the Teacher Resource Center and presented Silver Snoopy Awards to Rocketdyne employees in the Space Shuttle Test Complex. Members of the shuttle crew also joined SSC community leaders and center management for a luncheon at the Cypress House pavilion. The crew's simple words were enough reward for the hundreds of SSC workers who contributed to the nation's return to space. "Thanks for all the good work you've done," said Commander Hauck during a speech delivered at the base of the A-1 test stand. "You got us going, you got us back into space."[88]

---

86. "Stennis Space Center Engineers Develop Shuttle Imaging Device," *Lagniappe*, 24 October 1988, SSCHRC.
87. "Special Thanks To A Dedicated Team," *Lagniappe*, 24 October 1988, SSCHRC.
88. NASA-NSTL News Release, "Astronauts Thank Stennis Employees," 23 October 1988, SSCHRC.

Top Of The Mark

The success of the STS-26 mission that Commander Hauck spoke of at the SSC was shared by Director Jerry Hlass and his dedicated employees. During his nearly 13 years as head of the south Mississippi test and environmental complex, Hlass led a small but determined team to new heights—literally to the "top of the mark." The ambitious goals Hlass set for himself and his NSTL government-contractor team when he arrived at the NSTL in 1976 had been achieved by late fall of 1988. To the surprise of most SSC employees and community officials, on 22 November 1988, NASA Administrator James C. Fletcher appointed Hlass to the position of Assistant for Engineering and Technology to the Deputy Administrator at NASA Headquarters in Washington, D.C.[89]

At the same time, Fletcher named Deputy Director Roy Estess to succeed Hlass as director of the newly designated John C. Stennis Space Center. Estess, a test engineer who came up through the ranks, had served as deputy director of the south Mississippi facility since 1980. The Tylertown, Mississippi, native was a "strong right arm" as Hlass steered the installation through most of the 1980s and was there to assist Hlass in achieving his heady goals for the center.[90]

When Hlass arrived at the NSTL in September 1976, the future for the NASA laboratory looked bleak. The small, 69-member NASA organization was beset with serious morale problems. The NASA personnel feared extinction with the arrival of the Navy and with the MSFC's strong control of the test complex. The once-touted rocket-test facilities were woefully lacking in preventive maintenance and in some cases were rusting away, right in the very shadow of the test stands. The entire infrastructure was beginning to show age and wear; many facilities were becoming obsolete. The shaky tenure of the JSC-managed ERL indicated that it might be served better at its home base in Texas.[91]

---

89. NASA-SSC News Release, "Key Appointments Made At NASA Headquarters," 22 November 1988, SSCHRC; "Hlass To Take Headquarters Post; Estess Named Stennis Director," *Lagniappe*, 15 December 1988, SSCHRC.

90. *Ibid.*

91. Roy S. Estess, interview by Henry Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 1991, pp. 22–23, SSCHRC; Office Of Applications Engineering, "Management Review For Mr. Jerry Hlass," 27 August 1976, SSCHRC. A large number of NASA notables gathered at the Great Southern Club in the Hancock Bank to bid farewell to Jerry Hlass. Leo Seal, Jr., gave a brief talk outlining achievements of the SSC under Hlass's direction. Seal emphasized the "continued growth" during Hlass's tenure.

Hlass surveyed the situation when he arrived in 1976 and told his bosses at NASA Headquarters that the NSTL was "worth saving." Indeed, they gave the tenacious Hlass and his competent and experienced staff the opportunity to prove themselves. Hlass, with the help of his small but tough crew, went to work with a set of 10 goals that were as sacred to him as the *Ten Commandments*. To the astonishment of some and the satisfaction of many, Hlass rallied the south Mississippi team, and by November 1988 they not only achieved their goals, but they far exceeded their expectations. As icing on the cake, Hlass and his people were duly recognized by Dr. Fletcher, Admiral Truly, and even the President of the United States for their achievements.[92]

In 1976 when Jerry Hlass returned to Mississippi to take charge of the NSTL, there were 1,500 government and contractor personnel working with NASA and 18 federal and state agencies. When Hlass left for his Washington assignment in January 1989, there were 5,400 people employed at the SSC. The Navy's oceanographic programs and the Army Ammunition Plant, promoted by Senator Stennis, together brought in approximately 2,700 people. During the same period, over 1,200 government and contractor personnel were added to the NASA team.[93]

A mark of Hlass's leadership, evident to all, was the continuous construction and refurbishment of facilities during his management of the Mississippi installation. The rusting infrastructure that Hlass found in 1976, sparkled with new and improved facilities by the time he departed. He is especially remembered for helping his SSC people secure new programs, initiating personnel amenities, promoting education and public programs, and ensuring the success of the Space Shuttle test program by providing excellent facilities and support services.[94]

Most notably, Jerry Hlass inherited a struggling laboratory trying to find a toehold within the greater NASA "community" and left behind a dynamic John C. Stennis Space Center with experienced and well-qualified managers and personnel poised to grow into the decade of the 1990s. Indeed, Jerry Hlass succeeded in the SSC's "renasafication."[95]

---

92. "Admiral Truly Gives Major Awards For Space Shuttle Recovery Effort," *Lagniappe*, 13 January 1989, SSCHRC; Mack Herring, commentary, "Jerry Hlass—His Mark To Remember," *Lagniappe*, 13 January 1989, SSCHRC.

93. Leo Seal, Jr., remarks, Great Southern Club, Gulfport, MS, January 1989, SSCHRC.

94. *Ibid*.

95. Commentary, *Lagniappe*, 13 January 1989, SSCHRC.

CHAPTER 14

Bigger Dreams

An Exclusive Club

After the tenure of Jerry Hlass and the successful completion of his "renasafication" program, the John C. Stennis Space Center (SSC) was issued "Gold Card membership" in the eminent family of NASA research and spaceflight organizations. With full-fledged status in the elite club of NASA centers, the SSC was granted special privileges along with a number of weighty responsibilities.[1]

The staff members of the Mississippi facility obtained their status in the NASA hierarchy "the hard way." The SSC team earned its membership by working tirelessly for over three decades to prove worthiness of U.S. space exploration.[2]

---

1. Roger E. Bilstein, *Orders of Magnitude, A History of NACA and NASA, 1915–1990* (Washington, DC: NASA SP-4406, 1989), pp. 1–14; "NASA Celebrates 75 Years," *Lagniappe*, 16 March 1990, Stennis Space Center Historical Records Collection (henceforth referred to as SSCHRC).
2. "NASA Honor Awards 1996," *Lagniappe*, 20 June 1996, SSCHRC; "SSC Designated as Lead Testing Center," *Lagniappe*, 20 June 1996, SSCHRC; "National Aeronautics and Space Act of 1958," Public Law 85–568, 72 State. 426, pp. 334–338; Edwin R. Ling, Sr., *The Space Crescent: The Untold Story of the Mississippi Connection: The National Space Technology Laboratories* (Huntsville, AL: Strode Publishers, Inc. 1984), pp. 17–18.

Many of the men and women at the SSC led the installation in playing a significant role in many key NASA programs. For example, the SSC participated in testing Space Shuttle Main Engines (SSMEs), developing remote sensing techniques, promoting commercial space applications, transferring new technologies, and reinventing government by fathering a unique family of space and environmental agencies. Indeed, the pioneers of the space center laid a firm foundation for growth. The SSC's leadership literally stood on the "shoulders of giants" as they stretched to reach higher and higher levels of achievement.[3]

After years of toil and struggle to reach their new goals, a few of the initial SSC team members were still on board in 1989. These employees were working to recruit, train, and inspire a new generation of restless explorers. The hybrid team of seasoned veterans and their enthusiastic apprentices learned from each other as they combined their talents and resources in developing a new vision for the SSC. Following the dedication in August 1988, the new team dared to dream "bigger dreams" for an even brighter future for the SSC.[4]

With its new status, the leaders of the SSC quickly discovered that "there's no heavier burden than a great potential." But, in some cases, the team's perceived handicaps, such as its small organizational size, proved to be an asset in their continued effort to elevate the facility to a higher level of acceptance.[5]

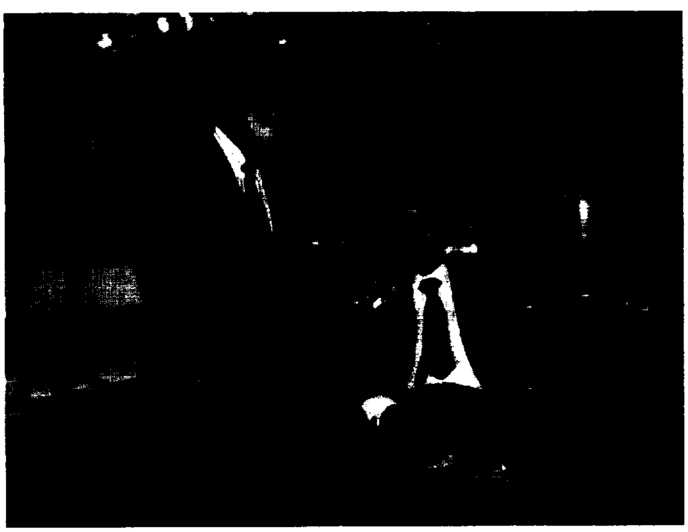
By the 1990s, many within NASA adopted a new operational concept known as "better, faster, and cheaper." Containing a strong emphasis on budgetary restraint, the new business theme proved to be extremely advantageous for the SSC in its quest to become the nation's "Center of Excellence for Propulsion Testing." The well-known SSC "can do" crew of the 1990s was not content with the status quo. Instead, the SSC team elected to choose a road less traveled that would lead to heretofore unthinkable frontiers of leadership in America's space program.[6]

---

3. "John C. Stennis Space Center Vision Statement," *Lagniappe*, 18 June 1992, SSCHRC.
4. John C. Stennis to Jerry Hlass, 4 August 1988.
5. Julie D. Meredith, "Memorandum For The Record: Hearing On The FY 1997 Budget Request Before The Subcommittee On VA-HUD-Independent Agencies Of The Committee On Appropriations," 16 May 1996, pp. 1–2; Charles Schultz, "Peanuts" (United Features Syndicate, Inc., 1958).
6. A.J. "Jack" Rogers, Jr., interview by Charles Bolton and Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 386, 1991, pp. 21–22, SSCHRC.

In Excellent Hands

When Jerry Hlass accepted a position at NASA Headquarters on 22 November 1988, Associate Administrator Truly selected Roy Estess as director of the SSC. Estess, who officially became director on 20 January 1989, had worked his way up through the ranks, serving in several engineering and management positions at the SSC and as deputy director since 1980. In addition, Estess had gained valuable experience working on important NASA-wide committees. In fact, Estess was recognized for his efforts as chairman of the Space Shuttle Processing Contract Review Team (1986–1987) after the 1986 *Challenger* accident. He was also recognized as chairman of the NASA-wide Equal Opportunity (EO) Committee for an unprecedented term of three years (1984–1987). For his efforts as chair of the EO Committee, Estess was presented with a NASA EO Medal. Additionally, in May 1988, he was awarded the Distinguished Executive Presidential Rank Award by President George Bush, the highest honor given to a civil service employee.[7]



Roy Estess, Stennis Space Center director, gives U.S. Sen. John C. Stennis a moment to liven up the crowd during an Old Timers' Day celebration for retirees at the center. (SSC-91-666-12)

7. NASA-NSTL News Release, "Estess Appointed Deputy Director," 29 August 1990, SSCHRC; "Hlass To Take Headquarters Post: Estess Named Stennis Director," *Lagniappe*, 15 December 1988, SSCHRC; Roy Estess, NASA Headquarters Office of Space Flight, "Space Shuttle Processing," *Report by Shuttle Processing Contract Review Team*, 9 February 1987; NASA-SSC PAO, "Roy Estess, Biography," January 1996.

The Mississippi-born and Mississippi-educated director had the full support of a team of his peers—engineers and researchers who served with him for years in the SSC organization. Together they had tested rockets as well as conducted Earth resources, space applications, and technology transfer programs. Many of the programs managed by Estess and his staff were national in scope, providing the opportunity for the SSC group to gain greater exposure and experience. More importantly, Estess and his staff spent many hours together planning for future roles for the SSC that would make better use of the installation's world-class rocket propulsion test and research capabilities.[8]

Estess's ability to work well as a member of a "team" and his sincere devotion to church, community, and state are two personality traits that enabled him to effectively govern the SSC as director. One member of his staff described Estess as a "straight shooter." Dr. Ramon Leake, Estess's pastor at the First Baptist Church in Picayune, Mississippi, in a completely unrelated appraisal, similarly described Estess as "straightforward" when he stated, "you soon got right to the heart of things with Roy." These personal and professional credentials have proved to be essential in the achievement of major goals for the SSC and the entire NASA organization.[9]

As a manager, Estess had and still has the reputation for respecting his employees. Over the years, he has become known as a "people person." His office door has always been open to all of his employees. The amiable Estess has never been able to resist hearing a problem from an old colleague or tuning in on a new idea from a young engineer. Estess is as comfortable discussing the weather with farmers at a country store in his rural community of Carriere, Mississippi, as he is exchanging scholarly matters with members of the Advisory Committee to the College of Engineering at Mississippi State University.[10]

---

8. NASA-SSC PAO, "Roy Estess, Biography," July 1992; NASA-SSC History Office, Chronology, "Pursuit of Propulsion Test Mission for the NASA John C. Stennis Space Center," January 1993; Roy Estess et al., "White Paper, Strengthening of Ground Test Capability for Large Propulsion Systems," 10 July 1986; "Harry Guin's Desk Ready Reference File," SSCHRC. Harry Guin, like many other NASA managers, kept a "Desk Ready Reference File" of papers and documents they felt to be very important and that they might need to refer to frequently. Harry Guin's secretary, Renay Nelson, graciously provided the author with Mr. Guin's file, which has been an invaluable resource for this text.

9. Ken Human, telephone interview by Mack Herring, SSC, MS, 14 June 1996, notes in SSCHRC; Aaron Cohen, telephone interview by Mack Herring, College Station, TX, 17 June 1996, notes in SSCHRC; Reverend Ramon Leake to Mark Formby, 19 March 1996; State of Mississippi, "House Concurrent Resolution, No. 128," 27 March 1996.

10. *Ibid.*

While in high school and during his college days, Estess played piano and saxophone in several bands, including a Glenn Miller-type dance band and a 1950s-style rock-and-roll group called "The Rolling Stones." His experiences as a musician taught him lessons of teamwork and respect for all members of the group, whether they are performing in the bright lights at center stage or doing their part "back in the shadows." Going into the job, Estess summed up his professional philosophy when he observed, "Being director is an important job, but every person at the SSC has an important job in terms of making things happen—making the place go. The people in the shops and the labs have their jobs to do, too. Working together, we all make it happen."[11]

In keeping with his policy of staying in touch with his employees, one of Estess's first actions as director was to move the director's office from the scenic, but physically distant, Rouchon House to the second floor of the main Engineering and Administration Building (Bldg. 1100). In making this move, Estess broke with the SSC tradition first established by Captain Bill Fortune and followed by Jackson Balch and Jerry Hlass.[12]

When Estess took office, all of the senior staff members except one had worked closely with him when he was a test engineer, deputy director, manager of the Regional Applications Program (RAP), and acting director of the Earth Resources Laboratory (ERL). Only Bill Taylor, the installation's associate director, was new to the SSC organization, having joined the staff in the fall of 1988 as associate director. Taylor, a senior engineer and manager from the Marshall Space Flight Center (MSFC), brought valuable experience as the MSFC's former Comptroller and project manager of the SSME Program Office. His extensive experience in technical program management and financial planning was a welcome addition to the SSC team that was preparing to make a major run at capturing new and significant propulsion programs for their new center.[13]

Another senior staff member, Harry Guin, with his optimistic and tenacious spirit, had long championed the idea that propulsion testing should be institutionalized within the NASA system. Guin hoped that the SSC would

---

11. Melinda Bowman, "New Stennis Director," *Lagniappe*, 16 February 1989, SSCHRC.
12. *Ibid.*; Roy Estess, interview by Mack Herring and Ms. Myron Webb, 24 April 1996, audio tapes and notes in SSCHRC.
13. Estess, interview; NASA-SSC Organization Chart, December 1989; "William Taylor Appointed Associate Director," *Lagniappe*, 18 November 1988, SSCHRC.

reach its potential as "a national asset for captive-firing large space-vehicle systems," a vision Wernher von Braun had extolled when the installation was created. A.J. "Jack" Rogers, Jr., who had been associated with the installation since its inception in 1961, envisioned greater status for the SSC. As a result, Guin, Rogers, and others at the SSC never lost sight of the original purpose of the facility—to test the nation's large propulsion systems into the "indefinite future."[14]

When Estess took the reins of the SSC in January 1989, his number one priority was to continue to fulfill the installation's responsibility in the testing of the SSMEs. He also intended to promote and support other propulsion programs assigned to the SSC and to strengthen support of the Agency research and technology programs. As a staunch advocate of the multiagency complex, Estess further pledged support of the resident agencies. To say the least, Roy Estess found his new job as director an "exciting" assignment.[15]

Friends In High Places

Following the successful return to flight in 1988, a number of top leaders retired or left NASA for less demanding positions. A true friend of the SSC, James C. Fletcher was one of the aerospace notables to announce his departure. Fletcher returned to the SSC on 8 April 1989 for a farewell visit.[16]

On 12 April 1989, President George Bush announced that Admiral Richard Truly would replace Fletcher as Administrator of NASA, and that J.R. Thompson, MSFC director, would assist Truly at NASA Headquarters as Deputy Administrator. These important appointments placed two longstanding SSC advocates in the highest positions in the Space Agency. In fact, Thompson had encouraged the SSC to pursue the goal of becoming NASA's "Center of Excellence for Propulsion Testing."[17]

---

14. Estess, interview; SSC-PAO Biography, "Harry Guin," May 1996; A.J. "Jack" Rogers, Jr., interview by Charles Bolton and Steven Patterson, Mississippi Oral History Program, University of Southern Mississippi, vol. 336, 1991, pp. 21–22, SSCHRC.

15. Estess, interview.

16. "Former Administrator Dr. Fletcher Bids Stennis Employees Farewell," *Lagniappe*, 19 April 1989, SSCHRC; NASA Headquarters, "Fletcher Biography," January 1996, SSCHRC.

17. "President Nominates Richard Truly To Head Nation's Space Program," *Lagniappe*, 19 April 1989, SSCHRC; NASA Headquarters, "J.R. Thompson Biography," May 1996, SSCHRC.

With Truly and Thompson in such important positions, the SSC team felt, as Jackson Balch once observed, the "stars were right" for the SSC to continue along its path toward a loftier status in the NASA family. Indeed, as the 1990s approached, Estess and his staff began to pursue their mission with renewed vigor. The SSC team envisioned an expanded role in propulsion testing in addition to other fields of proven expertise, such as commercial uses of remote sensing and the practical applications of space technology. The 20-year-old space and environmental multiagency complex also proved to be a major asset to NASA, especially with the addition and cooperation of the internationally known, world-class Naval Oceanographic Office.[18]

"Great Tides" In History

In testimony before Congress in 1979, the noted American author-historian James A. Michener expressed the concern that the country was not pursuing space exploration with the fervor that it should. He observed that there seemed to be "great tides" that operated in the history of civilizations, and that nations must be prudent to estimate these tides if they were to survive and prosper. The SSC's Roy Estess, Harry Guin, A.J. "Jack" Rogers, Jr., and many others on the staff sensed that they needed to move quickly with the new tide in NASA that featured leadership at the top who favored the SSC's long-sought-after goals in rocket testing.[19]

Estess knew that he had a mission to carry the SSC to a plateau beyond the level that Jerry Hlass had the opportunity to take the installation as its director. Because he felt the circumstances were right when he was appointed in 1989, Estess's principal mission from the earliest days of his tenure was to prepare the SSC for the future. He envisioned the installation's future role to be that of a "multiprogram propulsion test facility." In order to achieve that goal, the new director knew that he had to improve his staffing,

18. Roy Estess, interview by Henry C. Dethloff, Mississippi Oral History Program, University of Southern Mississippi, vol. 444, 1991, SSCHRC.

19. "James A. Michener, statement, Task Force on Defense, Foreign Policy and Space," Committee on the Budget, U.S. House of Representatives, 28 April 1992; Michener gave similar testimony before Congress in 1979. His central theme of "riding the great tides of history" actually came from an observation by William Shakespeare approximately 400 years earlier.

upgrade the facilities, and raise the level of the SSC participation in the Space Shuttle program.[20]

In an attempt to achieve the goal of full participation in the SSME testing program, members of the management team at the installation marketed the site as a facility with indefinite testing possibilities. Following the 1986 issuance of a document commonly known as the "White Paper," the team members followed a rocky path toward their goal of becoming NASA's national rocket testing center. The White Paper, which was a plan drawn up by a group of NSTL engineers, stressed the importance of "third-party testing" and the development of an in-place contractor and civil servant test team skilled in group propulsion testing.[21]

In a nutshell, the White Paper called for (1) consolidation of Agency testing at one location; (2) utilization of "an independent, NASA-managed, contractor-operated test team" to provide NASA with a continuing capability to test large propulsion systems; (3) employment of a support contractor to perform data acquisition, maintenance, and logistics, rather than depend on specialized hardware contractors.[22]

The provisions of the White Paper illustrated the possibility of great cost savings that could be achieved by NASA adopting the concept of a centralized test operation. In addition, the plan also pointed out that the move would save the taxpayers the cost of repeatedly studying sites, such as the south Mississippi facility, Edwards Air Force Base (EAFB), the MSFC, and Arnold Engineering Development Center (AEDC) as candidates for testing future rocket propulsion systems.[23]

The years since the White Paper presentation in 1986, and the trail followed by the team toward its ultimate mission, have proved the wisdom of the thinking that went into that simple document drafted to change the Agency's approach to testing rocket systems. The provisions proposed in the paper have come to pass. Somewhat surprising, also, the team at the Mississippi facility achieved even greater results than they anticipated at the time.[24]

---

20. Roy Estess, interview by Mack Herring and Myron Webb, SSC, MS, 24 April 1996; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996.

21. Roy Estess et al., "White Paper on Strengthening of Ground Test Capability for Large Propulsion Systems," SSC, MS, 10 July 1996.

22. *Ibid.*

23. *Ibid.*

24. *Ibid.*; Estess, interview.

The Search Begins

With the new leadership at NASA Headquarters and at the installation, the engineering team in Mississippi began a seven-year march toward the goal of establishing the facility as the nation's premier rocket-testing facility. There were many events, changes, and milestones along the path toward achieving this mark. The chronology of occurrences was highlighted by hard work, help from friends in top NASA management positions, and even, in some instances, by fate or "pure luck." Granted, the Mississippi team promoting the enhancement of the propulsion mission continued to work diligently after 1986 to effect changes in their mission. This resulted in an ever-increasing and stronger role in managing test support activities.[25]

By 1988, when the NSTL became known as the John C. Stennis Space Center, control of the support function, activation of the B-1 test position, and the positive actions taken by the team in promoting the Advanced Solid Rocket Motor (ASRM), and the National Aerospace Plane (NASP) programs had all contributed to the installation's stronger position within the NASA hierarchy. The excellent record of SSME testing, which featured both the MSFC test management and the SSC support management, also added to the growing status of the SSC.[26]

The last official act of Jerry Hlass on 18 January 1989, before he departed for an assignment at Headquarters, was the cutting of a tree to symbolically herald the beginning of the $40 million Component Test Facility (CTF), authorized to support the joint Air Force-NASA Advanced Launch System (ALS) project. The beginning of construction did not actually occur until some time later.[27]

The CTF was absolutely essential for the aerospace community to seriously consider the SSC as America's "Center of Excellence for Propulsion Testing." Most propulsion managers at the SSC, such as Boyce Mix, agreed that the CTF was the critical element in the future success of the SSC reaching its propulsion testing goals.[28]

---

25. Boyce Mix, interview by Mack Herring, SSC, MS, 22 April 1996; Patrick Scheuermann, Picayune, MS, 22 July 1996.
26. NASA-SSC History Office, Chronology, "Pursuit of a Propulsion Test Mission...," January 1993; "Lenoir Visits," *Lagniappe*, 23 August 1991, SSCHRC.
27. Roy Estess, interview by Mack Herring and Myron Webb, SSC, 24 April 1996; Jerry Hlass, interview by Mack Herring, Long Beach, MS, 27 February 1996.
28. Boyce Mix, interview, 22 April 1996; Patrick Scheuermann, Picayune, MS, 22 July 1996; The CTF Project, however, later needed additional funding of about $45 million for completion.

As the hardware initiatives moved forward, other associated events began to unfold that helped lay the foundation for the SSC to pursue its quest. In June 1989, Estess named Gerald Smith, who was manager of the MSFC's Space Shuttle Solid Rocket Booster Project, as his deputy director. Smith had headed up the important redesign of the shuttle's solid rocket motors, one of the most critical positions in the Agency during the return-to-flight process. With 25 years of engineering experience, the Auburn University engineering graduate brought to SSC important experience, in planning and implementing advanced propulsion test programs, as well as other research and development activities. Highly recommended by J.R. Thompson, Smith added credibility, as well as propulsion expertise, to the SSC team. With Associate Director Bill Taylor, the appointment of Smith gave the SSC two of the MSFC's top rocket program managers.[29]

Another personnel action that also favored the SSC occurred when Dr. William Lenoir was appointed on 13 July 1989 to fill the position of Associate Administrator for Space Flight, vacated by Truly when he was named administrator of NASA. Lenoir quickly became a friend of the SSC and wholeheartedly supported the idea of recognizing the installation as the Agency's major rocket test center. During a visit to the Mississippi facility after his appointment, Lenoir voiced strong backing of the SSC plan to perform "third-party testing" and for the facility to assume a test management role. In a later visit, Lenoir told the SSC management team that he was "pleased" with progress being made with the ALS and ASRM work at the SSC.[30]

Further recognition came on 30 August 1989 when Roy Estess and T.J. "Jack" Lee, who succeeded J.R. Thompson as director of the MSFC, signed a memorandum of agreement between the MSFC and the SSC stating that the SSC was responsible for the management and operations of the ASRM activity at the SSC after the qualification program for the ASRM was completed. The agreement also declared that the SSC would be responsible for test data acquisition, onsite processing, real-time evaluation of data, and data archival storage. Although the agreement stopped short of granting complete control of test operations, it was considered a positive milestone in recognition of the

29. NASA-SSC Biography, "Gerald Smith," May 1994; Gerald Smith, interview by Mack Herring and Myron Webb, SSC, MS, 22 December 1994, SSCHRC.

30. NASA-SSC History Office, Chronology, "Pursuit of A..."; NASA Headquarters News Release, "Dr. William Lenoir Appointed AA for Space Flight," 13 July 1989, SSCHRC.

SSC's emerging propulsion management role, especially with the MSFC's acceptance of the SSC's enhanced mission.[31]

An agreement similar to the ASRM memorandum involving the National Launch System (NLS, originally known as the ALS) was later signed by Estess and Lee. This second memorandum of agreement assigned the SSC even greater responsibilities, including test management, for all NLS test activities at the SSC. An important point in the NLS agreement established that the SSC would provide a civil service test conductor for NLS testing. Having a civil servant as a test conductor, in a function similar to a launch conductor at the Kennedy Space Center (KSC), was unprecedented. Even during the testing of the Saturn V first- and second-stage boosters during the Apollo program, a government employee had never served in that position at the Mississippi installation.[32]

With optimism running high at the SSC, the Propulsion Test Operations Office, headed by Harry Guin, issued its first charter 14 November 1989. The charter included direct language strongly favoring the SSC's pursuit of stronger missions in propulsion testing and provided for the "management of test operations for the test and evaluation of: systems, engines, and components for the Advanced Launch System, the Advanced Solid Rocket Motor, and all future propulsion systems assigned to [the] SSC." The charter can be seen as indicative of the spirit of optimism as a tool used to sharpen the SSC's focus on developing the facility's propulsion test objectives. The new roles that were given to the SSC in the ASRM, ALS, and National Aerospace Plane programs brought a new energy and purpose in addition to the potential for future hardware testing.[33]

In July 1990, Vice-President Dan Quayle, in response to the strong support of the Bush Administration for a robust space program, asked NASA Administrator Richard Truly to form an outside task force to consider the future long-term direction of the nation's space program. Truly's response was, "I am pleased the Vice-President has expressed his confidence in NASA.

---

31. NASA memorandum of agreement, Roy Estess and T.J. Lee, 30 August 1989, SSC Executive Records Collection, SSCHRC.
32. NASA memorandum of agreement, Roy Estess and T.J. Lee, 11 August 1991, SSC Executive Records Collection, SSCHRC.
33. NASA-SSC Management Instruction 1107.8C, 14 October 1989; SSC Propulsion Test Operations, "Charter"; NASA-SSC Management Instruction, 1107.8C, 14 November 1990.

We will work closely with the Space Council in pursuit of the President's remarkable vision for America's space destiny."[34]

On 25 July 1990, acting on Truly's recommendation, Quayle appointed Norman R. Augustine, noted aerospace proponent and chairman and chief executive officer of the Martin Marietta Corporation, as chairman of the Advisory Committee on the Future of the U.S. Space Program Task Force. On 10 December 1990, the "Augustine Committee" issued a report calling for the nation's civil space program to pursue a balanced set of five principal elements that included (1) a space science program, (2) a *Mission to Planet Earth*, (3) a *Mission from Planet Earth*, (4) an expanded technology development activity, and (5) a robust space transportation system. The SSC managers were buoyed by the contents of the report which was highly favorable toward propulsion and scientific programs under way at the SSC, especially recommendations calling for the development of new and cheaper launch vehicles to replace the Space Shuttle in the twenty-first century. A new family of boosters, of course, would require developmental and certification static-testing.[35]

Prior to the issuance of the Augustine Committee's final report, however, some historic SSME static firings were conducted on all three test stands at the SSC in one day. On 20 July 1990, a 771-second test on the B-1 position, an ignition test on the A-2 stand, and a 530-second static firing on the A-1 stand were accomplished.[36]

A sharper focus and significant recognition for the SSC came when NASA Deputy Administrator J.R. Thompson issued a "Roles and Mission" report on 8 November 1991. The report called for the SSC to be designated as a "Center of Excellence for Large Space Propulsion Systems Testing." NASA Administrator Richard Truly asked Thompson to do the study in response to the Augustine Committee report that criticized NASA for not having done a "Roles and Mission" study in 20 years. The recommendation made by Thompson was forwarded by Truly to Vice-President Quayle on 13 November 1991. The findings of the "Roles and Mission" statement were good news for the SSC employees who had worked so hard in the hope that

---

34. "Quayle Says Space Remains Top Priority," *Lagniappe*, 18 July 1990, SSCHRC.

35. Richard Truly, "NASA Briefing to National Space Council on the Advisory Committee on the Future of the U.S. Space Program Recommendations," 11 January 1991; Office of the Vice-President, Press Secretary, "Advisory Committee Chairman Appointed," 25 July 1990.

36. "SSC Marks First in Engine Testing," *Lagniappe*, 20 August 1990, SSCHRC.

the south Mississippi facility would attain the Center of Excellence status. The plan did, however, in a distribution of programs NASA-wide, call for a phasing out of two Earth- and life-science programs at the SSC, which included some core work carried out by the Science and Technology Laboratory (formerly the ERL).[37]

In a letter attached to the comprehensive document, Thompson specifically noted that the SSC had traditionally been viewed as a test site for large systems testing, predominately for work overseen by the MSFC. Thompson concluded that the SSC role should be expanded to "manage and execute" the test program defined by the development centers. Thompson emphatically stated, "They [SSC] can do it." Truly forwarded the report to Vice-President Quayle and said he intended to make the report a "vital part" of the Agency's continual improvement efforts.[38]

J.R. Thompson's report and Truly's "Administrator's Decision Memorandum," on 30 December 1991, agreeing on the SSC's role as NASA's Center of Excellence for Testing Large Propulsion Systems, were certainly major steps toward recognition for the SSC. Estess and members of his staff, however, knew there was still much to be done before they could breathe easy with the knowledge that their prize had actually been won. After all, the senior members of the SSC staff had suffered disappointments in the past while pursuing illusive goals and had accepted lesser rewards. In addition to remembering old adversities, the SSC managers were also very much aware that Thompson's report did not grant their installation the "test management" role for the SSME program, nor was the SSC awarded the coveted "lead center" status that many other NASA centers were given in various science, technology development, and exploration roles.[39]

As the new year of 1992 opened, the SSC staff returned to work with an even stronger resolve to continue their drive toward achieving their goals. On 31 January 1992, a draft implementation plan for the achievement of the

---

37. J.R. Thompson, "Roles and Missions Report," 8 November 1991.
38. J.R. Thompson to the NASA Administrator, 8 November 1991; Richard H. Truly to the Honorable J. Danforth Quayle, 13 November 1991; Richard H. Truly to NASA Headquarters Officials, and Center Directors-Field Installations, "Memorandum of Decision," 13 December 1991.
39. *Ibid.*; Gerald Smith to NASA Associate Administrator for Space Flight, 31 January 1992; "SSC and Thompson's Roles and Mission Report," Harry Guin Desk Ready Reference File, SSCHRC. In this memorandum for the record, Harry Guin noted that Thompson's "Roles and Mission Report" failed to grant the SSC a "Test Management Role."

Center of Excellence status by the SSC was forwarded to the Headquarters by SSC Deputy Director Gerald Smith.[40]

Capitalizing on the apparent SSC loss of science programs, the implementation plan maximized the use of facilities, equipment, and people affected by the transition out of Earth- and life-science disciplines into a matrix organization supporting propulsion testing. The SSC management also highlighted the fact that the work of personnel in the Science and Technology Laboratory on commercial remote sensing programs had been very successful. Smith further pointed out that the SSC had very experienced civil service personnel, contractor test engineers, and test conductors already working at the facility. Smith carefully explained that the civil servants, engineers, and test conductors, who were already involved with a variety of liquid- and solid-propulsion test programs, were more than capable of carrying on the SSC's immediate responsibilities for the ASRM and ALS, as well as undertaking missions that might be assigned in the future.[41]

The "can do" team at the SSC did not complain as they accepted their hard-earned, newly acquired Center of Excellence status. A few of the other NASA field centers, however, objected to the SSC being named a Center of Excellence. Their reactions would have been even sharper if Thompson had suggested that the SSC be designated the "Lead Center for the Testing of Large Propulsion Systems." According to Roy Estess, "J.R. Thompson staked out the potential for us [the SSC] to be declared the Center of Excellence [in the report], and Admiral Truly made that decision."[42]

The Statecraft Of Shuttle Diplomacy

An opportunity to gain further recognition for its management expertise was presented to the south Mississippi facility when J.R. Thompson stepped down as Deputy Administrator to enter private business on 8 November 1991. Thompson's departure left Truly in need of a strong person to help him run the Agency until a new deputy could be recruited and approved.[43]

---

40. NASA-SSC "Implementation Plan for a Center of Excellence for Large Space Propulsion Systems Testing," Rev. 10, Final Draft, Harry Guin Desk Ready Reference File, January 1992, SSCHRC.
41. *Ibid.*
42. Estess, interview by Mack Herring and Myron Webb, SSC, 42 April 1996.
43. *Ibid.*; Mark Craig, telephone interview by Mack Herring, SSC, MS, 21 June 1996.

Roy Estess was a logical choice because he had worked closely with Truly and Thompson for years and had attained a reputation among his peers for "sound judgement and fairness" in his straightforward management style. The position he was offered was called "Assistant to the Administrator." In essence, the job called for Estess to work in a number of management functions handling issues affecting the Agency, as well as serving as an "unofficial" deputy to Truly.[44]

Admiral Truly, a native Mississippian who had been an advocate of the SSC since accepting the challenge to help put NASA back into space in 1986, announced his resignation as NASA Administrator effective 1 April 1992. Some members of the SSC team worried that the center's new Center of Excellence status might be endangered by the new Headquarters's management. A first sign that the SSC at least had a foot in the door at NASA Headquarters came when the new Administrator, Daniel S. Goldin (1940-), former Vice-President and General Manager of TRW Technology Group, asked Estess to stay on at NASA Headquarters to assist him during the transition period.[45]

When Truly announced his resignation, he told NASA employees, "Anytime leadership changes in an organization, it can be a time of rough seas. In the Navy, when you enter very tough situations and rough seas, there is a saying, "Steady as she goes!" The Admiral predicted the organization would keep "steady" and move "full speed ahead." No doubt Truly recognized that NASA had many leaders, such as Roy Estess, to help steer the NASA ship. Estess's experience as director at the ever-evolving SSC, with its many changes in direction and management style, certainly prepared him to help his Headquarters's colleagues during the Agency's transition. Outgoing Administrator Truly named Aaron Cohen, director of the Johnson Space Center (JSC) in Houston, Texas, to serve as Acting Deputy Administrator to help in the day-to-day operations of the Agency and to assist during the transition period.[46]

---

44. NASA-SSC PAO Biography, Roy Estess, 8 July 1992; Estess, interview.
45. Marcia Dunn, Associated Press, "NASA Administrator Richard Truly Resigns," 14 February 1992; "Admiral Truly Submits Resignation," *Lagniappe*, 21 February 1992, SSCHRC; Richard H. Truly to Officials in Charge, Headquarters Offices, Directors, NASA Field Installations, "Briefing Materials For Mr. Daniel S. Goldin," 12 March 1992; Estess, interview by Mack Herring and Myron Webb, 7 July 1995; NASA Headquarters, Daniel S. Goldin, Biography.
46. *Ibid.*

Goldin took the reins of NASA on 1 April 1992 and quickly introduced a number of reforms that resulted in a revitalization of the space agency. His first initiative was to bring NASA's budget process under control. Goldin created a series of management teams in order to find ways to operate programs "faster, better, and cheaper," without compromising safety. He named Estess to chair a "no holds barred" institutional study of the Agency's roles and missions.[47]

As Goldin's introspective look into NASA's total management practices continued, he assigned Estess to use the roles and missions findings in a team assessment of Space Station *Freedom*, a program that had been the subject of much debate by politicians, industry leaders, and internal NASA officials. During their evaluation, Estess and his team members used data from the roles and missions analysis to help develop management improvements, new approaches in hardware definition, and cost savings in the troubled Space Station program.[48]

One of their decisions, to move Level II management from Reston, Virginia, to the JSC, resulted in page one political reverberations. In the final analysis, the studies led by Estess contributed to the decisions by Administrator Goldin leading to the salvation of the Space Station *Freedom* program. In addition, Estess's studies resulted in the Goldin administration's gaining favor from a Congress that was obviously pleased with the new management approaches in the Space Station program and, especially in the cost savings effected in the controversial program.[49]

While still at NASA Headquarters, Estess accompanied the new Administrator on his first field visit to the SSC on 14 April 1992. Goldin was given a tour, which included one of the SSME test stands and the construction site for the ALS's CTF. Following the tour, Goldin commented, "The attitudes are right among the Stennis people. You're a very close, tight team. You have a vision about where you want to go, and you understand Total Quality Management."[50]

---

47. Goldin Biography; Charles F. Bolten to Headquarters Officials in Charge, Field Center Directors, 7 May 1992; Cohen, interview; Craig, interview.
48. Aaron Cohen to NASA Review Team Participants, 13 August 1992, SSCHRC; Daniel S. Goldin to U.S. Representative Bob Traxler, Subcommittee on VA-HUD-Independent Agencies, U.S. House of Representatives, Committee on Appropriations, 2 December 1992, SSCHRC; Roger D. Launius, *NASA: A History Of The U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Company, 1994), pp. 122–124.
49. Myron Webb, interview by Mack Herring, SSC, MS, 25 June 1996; Gerald Smith, telephone interview by Mack Herring, Atlanta, GA, 5 July 1996.
50. Webb, interview; Estess, interview by Mack Herring and Myron Webb, 7 July 1995; Smith, telephone interview.

At a gathering of all NASA team members, Goldin enjoyed mixing and talking informally with the SSC employees, especially the 20 young engineers and new hires obtained to help with the ALS and ASRM programs. After a few minutes of informal chatting, the more uninhibited members of the team began sharing their ideas with Administrator Goldin, giving the new Administrator opportunity to continue an unusual, give-and-take exchange. Before departing, Goldin congratulated the SSC on the newly received designation as a "Center of Excellence" for testing the nation's large propulsion systems, but he challenged the positive group to stretch to be the "best in the world' at testing large propulsion systems. There was no doubt that Goldin was impressed and heartened by the energy and morale of the "can do" SSC team.[51]

Although Estess's contributions at the Headquarters primarily involved assisting Truly and then Goldin in their day-to-day management of the entire Agency, the SSC director met and worked with many top NASA executives. Estess dealt on a daily basis with associate administrators, field center directors, aerospace managers from across the country, and members of the Congress and staff assistants.[52]

Acting Deputy Administrator Aaron Cohen said Estess never lobbied for his own Mississippi installation as he went about his Headquarters's assignments. Cohen added, however, that Estess's noted forthright approach to management and his fair and even-handed analyses of problems contributed greatly to the credibility of the man from Mississippi. Cohen explained that Estess's positive reputation was seen by his Headquarters's colleagues, in part, as a reflection on and response to the SSC culture. This view of Estess, according to Cohen, contributed to the overall appreciation by many NASA officials of the entire SSC team and their ability to get the job done. Furthermore, Cohen observed, NASA officials learned that when "Roy Estess told you something, you knew he was speaking for the good of the Agency and not his own center's parochial interests."[53]

Estess officially terminated his Washington, D.C., assignment on 8 May 1992. He did, however, continue his "shuttle diplomacy" by making numerous trips back to Headquarters to assist Administrator Goldin in instituting new

---

51. "Goldin Makes Initial Visit To SSC," *Lagniappe*, 20 April 1992, SSCHRC; Estess, interview, 24 April 1996; Smith, interview, 5 July 1996.
52. Estess, interview, 24 April 1996.
53. Cohen, telephone interview.

policies. Estess's sporadic work at the Headquarters continued to bring him in contact with many senior NASA and aerospace managers, such as well-known JSC executive Mark Craig.[54]

Big Boosters For The Future: The Story Of ASRM And ALS

The early half of the 1990s did, indeed, bring great success to the SSC in its preparation to test the proposed engines and components for two of the nation's future rocket boosters. The changing priorities and downsizing of the federal government during the period, however, also held some jarring disappointments for the SSC. The ASRM project was canceled by President Bush when he released his fiscal year 1993 budget in January 1992. The President's budget was supported by Admiral Truly, who stated the ASRM's cancellation was due to an "affordability issue." After much debate, and despite efforts by Mississippi's congressional delegation, the ASRM was finally terminated by the Congress in October 1993. Likewise, changing programmatic priorities and shrinking budgets of the military and NASA prompted abandonment of the joint Air Force-NASA National Launch System (NLS) program that included the CTF at the SSC.[55]

ASRM: In Dubious Battle

NASA had pushed for a more powerful and safer "advanced" solid rocket motor following the *Challenger* disaster. NASA also wanted to obtain a non-contractor site, where the Agency could provide for the future manufacturing of solid rocket motors. With practically unlimited backing from the Bush Administration and the Congress, the ASRM project moved along with added popular grass-roots support through its planning and facility development stages.[56]

---

54. Estess, interview by Mack Herring and Myron Webb, 7 July 1995; Craig, interview.
55. "ASRM Still Endangered," *The (Gulfport, MS) Sun Herald* (henceforth referred to as *The Sun Herald*), 30 January 1992; Launius, *NASA: A History Of The U.S. Civil Space Program*, p. 124.
56. NASA-SSC Fact Sheet, PAO, "Advanced Solid Rocket Program," April 1991; Gerald Smith, Press Briefing, 28 August 1990, transcript in SSCHRC; "Senate Committee Supports ASRM," *The Sun Herald*, 17 June 1992.

Largely through the advocacy of U.S. Representative Jamie Whitten, chairman of the powerful and influential House Appropriations Committee, the Yellow Creek site near Iuka, Mississippi, was chosen as the ASRM manufacturing site in July 1988. The Iuka location, on Tennessee Valley Authority property, was in close proximity to the MSFC at Huntsville, Alabama. At the same time, the SSC was selected as the site for static firing and certifying the new solid rocket motors.[57]

It is important to note that at the time the SSC was selected as only the ASRM testing facility, most employees at the SSC were not happy with the decision. Jerry Hlass, SSC director; Deputy Director Roy Estess; and the SSC NASA team had hoped the SSC would be selected for both the manufacturing and testing of the ASRM. Hlass said that he did not want his installation to have the potential community relations problems that could come from testing solid propellants without the benefits to be gained from an estimated 1,400 "manufacturing process" jobs. Unfortunately, Hlass did not get his "wish." The SSC ASRM testing facility would employ about 200 engineers and technicians with another 400 people employed at the nearby Michoud plant and in Slidell. At first, Hlass and his staff expressed disappointment that the SSC was not selected for the manufacturing and testing of the ASRM. Nevertheless, the SSC accepted the test role.[58]

Long before the ASRM project could get off the ground, a small but highly effective group of environmentalists mustered a prolonged protest against the ASRM testing. The ASRM opposition group, called "Citizens for a Healthy Environment," claimed exhaust emissions generated by an ASRM static firing would contain harmful toxic chemicals that would fall on the area surrounding the SSC. Before the issue was settled, the public exchange between NASA, the "Citizens for a Healthy Environment," and two Mississippi State University researchers was extensively aired by local news media and widely discussed in the surrounding communities.[59]

---

57. Lanee Cobb, "Advanced Solid Rocket Motor Program," Calendar of Events, April 1992; "Biography: James L. Whitten, U.S. Representative, Mississippi," SSCHRC.
58. Hlass, interview, 27 February 1996.
59. Jacqui Cochran, "Citizens Set to Stop ASRM," *The (Bay St. Louis, MS) Sea Coast Echo* (henceforth referred to as *The Sea Coast Echo*), 2 May 1991; Sharon Ebner, "Scientist: Pollutants More Dangerous Than NASA Letting On," *The Sun Herald*, 22 October 1989; D.C. Harvill, "ASRM Tests at Stennis May Pose Threat to Environment," *The Sea Coast Echo*, 27 July 1989; "Planned ASRM Testing at Stennis Will Not Harm the Environment," *Lagniappe*, 20 October 1989, SSCHRC.

Members of the SSC staff, who had enjoyed excellent community support since the facility's earliest days, were stunned by the apparent opposition to the ASRM test project. Led by Estess, a number of senior staff members, NASA and contractor personnel, and supportive community leaders launched a proactive campaign to better inform the people in the communities about the ASRM firings to assure them that the SSC would not undertake a program that might harm the environment. Environmental problems were not a consideration during the Saturn V testing of the 1960s and 1970s, nor during the many years of SSME testing. Only the Saturn V first-stage booster-stage (S-IC) propellant had contained a product, RP-1 kerosene, that could be considered the least bit harmful; but, ultimately, the public was not really concerned about their safety.[60]

By 1989, although a majority of the citizens in the surrounding communities believed in the credibility of the SSC leaders and personnel, SSC management felt it necessary to solicit positive support from their community friends in the wake of the controversy. After all, SSC personnel had been entrusted to conduct testing for a national rocket development program. The south Mississippi team felt a strong obligation to see the ASRM project through to a successful conclusion, following the determination that the test program was safe to humans and the environment.[61]

Over a three-month period, beginning in the summer of 1989, SSC director Roy Estess; Dr. Rebecca "Becky" McDonald; Ken Human; A.J. "Jack" Rogers, Jr.; Dr. William "Bill" Huseonica; and Ms. Myron Webb; along with other SSC staff members, carried the SSC environmental message to the local communities. At public hearings conducted by the State Pollution Control Board and the U.S. Army Corps of Engineers, the SSC staff personnel answered numerous questions posed by the media and the general public.[62]

---

60. See Chapter 4 of this text for account of public backing of NASA-MTF during the early 1960s, and especially the appreciation shown for NASA's arranging for the mosquito spraying of the Gulf Coast in 1963.; Alvin Toffler, *Future Shock* (New York: Random House, Inc., 1970), p. 327; Eric Foner and John A. Garraty, eds. *The Reader's Companion to American History* (Boston: Haughton Mifflin Company, 1991), pp. 219–220.

61. Dawn Moragne, "NASA Officials Address ASRM Environmental Concerns," *The Picayune (MS) Item* (henceforth referred to as the *Picayune Item*), 30 August 1989; Will Sullivan, "Local Meeting Becomes Confrontation Over ASRM," *Picayune Item*, 27 October 1989; Skippy Allen, "NASA Sure of Rocket Test Safety," *The Slidell (LA) Sentry-News*, 28 October 1989; NASA-SSC PAO Fact Sheet, "Statement by NASA Officials at the John C. Stennis Space Center," 5 June 1991.

62. *Ibid.*

At every juncture during the environmental debate, SSC officials carefully explained their commitment to protect the communities in which they lived. The provisions in the environmental impact statements and the extensive measures the SSC was undertaking to comply with all of the stringent state and federal environmental laws and regulations were described. The SSC team also explained the comprehensive monitoring program that would be put into place to ensure the safety of people in the local communities, as well as the south Mississippi and nearby Louisiana environments, during the two-minute ASRM static firings. NASA Headquarters's managers stated that there would only be two tests in 1994, three in 1995, two in 1996, and two tests per year after 1996. Two court suits were brought against executives from NASA and other federal agencies associated with the ASRM program. Both suits, however, were dismissed by the courts, one in 1992 "without prejudice for failure to state a claim," and the other in 1994 for "mootness," because the matter came before the court after the ASRM program was terminated.[63]

The SSC Chief Counsel Ken Human believed there was a turning point in the public opinion battle surrounding the testing of the ASRM. Public opinion began to alter after he and the SSC's Public Affairs Officer Myron Webb met with Susan Santos, research program director for the Center for Risk Communications at Columbia University, New York. The purpose of the meeting was to arrange for the specialist to conduct a risk management seminar at the SSC in April 1990. Santos helped the SSC program managers to not only better understand the aspects of managing programs that had potential for upsetting environmental advocates, but also to understand the importance of good communications with the public.[64]

While the ASRM ruckus was still going on, budget storms continued in Washington, with Senator Trent Lott and his Mississippi colleagues, Senator Thad Cochran and Representative Jamie Whitten, fighting to keep the ASRM program alive. During the April 1991 debates, Lott said, "I am satisfied that the principles of ASRM are correct. We have to go on to the next generation of rocket motors."[65]

63. "Wetlands Group Sues NASA," *The Mobile* (AL) *Press Register*, 29 May 1991; "ASRM Protest Group Said Ready to File Anti-test Suit," *Picayune Item*, 28 May 1991.

64. Human, interview.

65. Al Giardi, "Lott Supports More Rocket Funding," *The Sun Herald*, 19 April 1991.

Lott, however, also offered an ominous observation about the ASRM's future when he said, "If they underfunded the program early, I am afraid there will be problems." At the same time, SSC Director Estess said that he was pleased with the overall budget plans for 1992–1993, but that he was also worried about the program's future. "We can stay alive," Estess said, "but it's tight." The ASRM struggled through the 1991 budget debates and finally, in September 1992, the Congress appropriated $360 million for the fiscal year 1993 funding.[66]

While the budget furor raged in Washington, the SSC proved that the facility could conduct the planned ASRM testing without harm to people and the environment. Mississippi's Department of Environmental Quality and the U.S. Army Corps of Engineers granted the SSC the necessary permits to proceed. With these permits in hand and the court suits dismissed, the SSC was cleared to begin construction of the facilities and prepare to test the ASRM at the installation. With land clearing and grubbing already accomplished, a $9.7 million contract was awarded to Dunn Construction Company, Inc., on 11 October 1992. Under NASA supervision, actual work began on 3 November 1992 on the ASRM test stand, to be located east of the B-2 test stand. A relieved Lon Miller, ASRM program manager, deemed the initial start of construction "a major step" in the test program at the SSC.[67]

Morale was high at the SSC as construction began on the $50 million ASRM project, and with good reason. After all, the facility was preparing to test another major rocket system of the Space Shuttle. Even when the budget battles turned sour in Washington, D.C., the enthusiasm of the SSC team did not diminish. Myron Webb, Public Affairs Officer, told the press in June 1993, "We are disappointed, but not too surprised. We've got to continue construction until [the] Congress makes a final decision." The decision, directing NASA to terminate the ASRM program and construction of the test facilities at the SSC, came in October 1993 when the project was about 80 percent complete.[68]

Although, during his bid for the Presidency, William Jefferson "Bill" Clinton (1946–) said he supported ASRM, he also ran into fiscal problems

---

66. *Ibid.*; "Senate Committee Supports ASRM," *The Sun Herald*, 25 September 1992.
67. "Bush's Final Budget Cuts Fund for ASRM," (Corinth, MS) *Daily Corinthian*, 7 January 1993.
68. "House Panel Votes to End ASRM Project," *Northeast Mississippi Daily Journal*, 10 June 1993, SSCHRC.

with the Congress in the spring of 1993. President Clinton told Lott and Whitten that he would support $300 million for the ASRM program for fiscal year 1994. That figure, however, was still far below the $380 million that ASRM contractors said was needed to keep the project on track. Additionally, at least four bills were filed in the Congress to kill the project.[69]

Indeed, the Clinton 1994 fiscal year budget contained $305 million for "construction, research, and development" of the ASRM. Unfortunately, the House Science, Space, and Technology Committee rebuffed the Clinton budget and instead voted to terminate the ASRM project. The Committee then voted to allocate $150 million to phase-down and terminate the project. The savings from the measure were earmarked to be applied to "deficit reduction."[70]

Estess and his staff, needless to say, were extremely disappointed when they received the news of the termination of the project. A large number of personnel at the SSC had worked to obtain the environmental permits and were looking forward to the new program. Scientists at the SSC were prepared to play a major role in the ASRM testing by using computer-modeling techniques to do basic research for future environmental monitoring. The SSC scientists had made plans to work with state researchers to perform landmark environmental monitoring of the ASRM tests. No doubt this research would have had national application for other environmental programs.[71]

The demise of the ASRM program was a disappointment for the SSC. There were, however, positive results that came from the project. About 20 new NASA civil service engineers and an additional 15 administrative personnel were justified and recruited for the ASRM and ALS programs. Many of these employees, hired straight out of colleges and universities, gave the SSC the opportunity to strengthen its technical capabilities with this influx of young engineers. The ASRM and ALS projects also gave the SSC the leverage to win its personnel argument for the addition of these bright, talented engineers. The ASRM program allowed the SSC the opportunity to experience "real-life" lessons in environmental risk management. In fact, by the

---

69. *Ibid.*

70. "Funds for ASRM Cut Again," *Daily Corinthian*, 10 June 1993.

71. A.J. "Jack" Rogers, Jr., interview by Mack Herring, 27 June 1996; Charles "Chuck" Stewart, interview by Mack Herring, SSC, MS, 1 June 1996; Human, telephone interview; Lon Miller, interview by Mack Herring and Myron Webb, SSC, MS, 4 June 1994; A popular SSC engineer, Chuck Stewart was named construction manager, and his personality added to the spirit of the team.

time the various permits were finally issued for the project, SSC personnel were considered the leading experts in NASA on handling environmental matters. More importantly, the SSC came out of the ASRM project with an even more experienced propulsion management team, keenly aware of changing national priorities and the fragility of the fickle fortunes of political fate. But, more importantly, the SSC team emerged from the ASRM experience with added resolve and a renewed spirit to continue toward future goals.[72]

NLS-CTF: Legacy Of The Heavy Lifters

During the early 1990s, the ASRM project had a "sister" propulsion initiative that also moved the SSC ahead in its drive to become recognized as the nation's leading rocket test center. The ALS program, later called the NLS, found its way to the SSC when the Department of Defense (DoD) learned of the SSC's capabilities through NASA-SSC engineers and members of Senator Stennis's office. In 1987, the Air Force became interested in locating rocket engine component technology research facilities in Mississippi. The DoD contended that such facilities were needed to support the development of the heavy-lift launch vehicles needed to perform military space missions requiring payloads too big and too numerous for the NASA-operated Space Shuttle.[73]

Even before the extensive redesign of the shuttle after the *Challenger* disaster, the all-purpose craft only had a maximum payload capability of about 65,000 pounds. This payload capacity was reduced, to about 50,000 pounds with new safety features and other modifications. The DoD wanted future vehicles that could transport 150,000 to 200,000 pounds into Earth's orbit. At the time, NASA also wanted to start development of a "family" of less expensive launch vehicles for use in future civilian programs. In order to minimize the expense of the development of new launch systems, the DoD and NASA entered into an agreement to jointly develop a new generation of launch vehicles.[74]

---

72. Human, interview; Lon Miller, interview; Stewart, interview.
73. "Heavy Lifter is Said to Reflect SDI Development," *Aerospace Daily*, vol. 140, no. 60, Washington, DC, 31 December 1986, p. 473.
74. *Ibid.*

On 4 January 1988, President Ronald Reagan approved and forwarded to Senator Stennis a joint NASA-DoD report on the Advanced Launch System. The Presidential report covered a wide range of topics, among them the use of facilities which identified the National Space Technology Laboratories (NSTL—later renamed the John C. Stennis Space Center) as an existing government site that was available for ALS testing. Senator Stennis then received a document of "clarification" on 9 March 1988, from Air Force Secretary Edward C. Aldridge recognizing the experience and capabilities at the south Mississippi installation. The clarifying statement reported that the DoD acknowledged the broad, national space capabilities developed by NASA during the previous three decades. The document further stated that "all" liquid engine propulsion testing in the ALS program would be accomplished at the Mississippi facility.[75]

On 11 March 1988, Stennis was pleased to announce that the agreement between the Air Force and NASA would place the Mississippi installation in an "excellent position to perform the crucial testing on the ALS engines for the military, as well as for NASA." Ultimate cost of the facilities for the testing at the NSTL was estimated to be $300 million. Senator Stennis also pointed out that the utilization of the NSTL would "prevent costly duplication" of rocket test facilities at military sites elsewhere, when they already existed at the NSTL.[76]

In July 1988, while personnel were preparing for the 3 August renaming and dedication ceremony of the NSTL, funds were released for the joint NASA-Air Force ALS technology program. The action allowed the south Mississippi facility to begin work on construction of the testing facility. Robert Bruce, chief of the onsite Advanced Planning Division, stated that the planned CTF would be a unique, world-class test facility. Bruce pointed out that the only comparable operation was located in France. Gerald Pitalo, the SSC's interface in 1988 with the ALS joint program office in El Segundo, California, said, "Our challenge is to get the job done [build the CTF], not only on schedule, but within the [allotted] dollar amount." As construction proceeded on the structures, about 100 workers were

---

75. *Ibid.*; White House News Release, "Report to Congress," 4 January 1988, SSCHRC; "ALS Report Signed By President Reagan," *Lagniappe*, 20 January 1988, SSCHRC.

76. *Ibid.*; "NSTL To Test Engines For Advanced Launch System," *Lagniappe*, 20 January 1988, SSCHRC.

employed. The facility was located on 20 acres of choice SSC fee-area real estate near the extreme southern portion of the access canal leading to the A-1 test stand.[77]

Once again, changing priorities in Washington, D.C., in national aim and fiscal downsizing of government, produced waves of misfortune that affected the SSC. As the Cold War continued to wind down, aerospace industry woes proliferated when the nation and the Congress turned their backs on the Reagan era "Star Wars" Strategic Defense Initiative (SDI) for missile defense. As the SDI program faltered, the joint Air Force-NASA launch vehicle cooperative suffered severe growing pains. The SSC ALS program manager, Robert Bruce, said the termination of SDI was a factor, but funds had already begun to trickle down, ever so slowly. "For reasons unknown" to him and others involved in the ALS program, NASA continued to underfund its part of the "dollar-for-dollar" agreement with the Air Force.[78]

NASA's failure to match the Air Force ALS funding, even from the early years of the program, was baffling. Perhaps the answer to this mystery can be found in the fact that at the same time early preparations were under way for the ALS, most NASA Headquarters planners were supporting President Bush's Space Exploration Initiative (SEI) that called for a mixed launch vehicle fleet. The Bush doctrine calling for a more flexible transportation system was detailed in the National Space Council's report on 4 January 1991. The effects, of course, impacted the development for the CTF at the SSC. Construction contracts were slowed down as NASA tried to continue the $78 million project with incremental funding from the ALS program. Unfortunately, the SSC never received full funding for the project during the first half of the 1990s.[79]

---

77. "Money Released for ALS Program," *Lagniappe*, 28 July 1988, SSCHRC; "Description, CTF," *Lagniappe*, 28 July 1988, SSCHRC; NASA-SSC News Release, "Stennis to Begin Construction on $40 Million Test Facility," 18 January 1989, SSCHRC; "Tree Cutting Marks Start of Facility," *Lagniappe*, 18 January 1989, SSCHRC; NASA-SSC Advanced Program Development Office, "Test Facility Capability Handbook," January 1995, p. 3.3-1; Pitalo, who became the chief of the Component Test Facility (CTF) Project Office, shared honors with outgoing SSC Director Jerry Hlass on 18 January 1989 to kick off construction of the state-of-the-art test facility. Pitalo has said the concept of the CTF was to determine the operational limits of turbopump assemblies "before they were integrated into an engine propulsion system."; Robert Bruce, interview by Mack Herring, Gulfport, MS, 29 June 1996; The Star Wars defense program was finally terminated by the Congress on 13 May 1993.
78. *Ibid.*; Bruce, interview.
79. *Ibid.*; NASA Headquarters, "Mission to Mars," HQL-281, ud.

It was obvious that the unfinished facility had a use as a rocket component training site for its new engineers. In fact, the first use of the CTF came in 1993, when SSC engineers successfully conducted a series of tests, for the American Rocket Company of Ventura, California, that specialized in commercialization of low-cost hybrid rocket propulsion. The 10 developmental tests signaled the first firing of such a motor and the first use of the SSC's CTF. NASA's Bill Kahle, hybrid rocket motor project manager, noted that the success of the tests were not only due to the capabilities of the CTF, but also because of the expertise of the engineers and technicians conducting these milestone tests. These tests also marked a new way of doing business with private industry.[80]

In addition to the facility's early utilization, the CTF also was an extraordinarily important asset for the SSC during the first part of the 1990s, as a centerpiece of the SSC's quest to become a "Center of Excellence for Propulsion Testing." Boyce Mix, chief of the Propulsion Test and Engineering Directorate, stated that the SSC would have never been considered for the designation of Center of Excellence status without the CTF. Robert Bruce, SSC chief of Advanced Program Development, agreed with Mix that the CTF was a critical component in NASA's decision to consider the SSC for its future propulsion management plans. Thus, the world-class CTF facility never quite reached its intended utilization by mid-1996, but the facility is destined to play a major role in the long-range future of the SSC.[81]

The HHFF: Aboard The Orient Express

When President Ronald Reagan unveiled his NASP program in January 1984, few future planners in the nation pictured that at least part of the technology development of the futuristic airplane would wind up at the SSC. Dubbed the "Orient Express," due to its potential to travel at unbelievable speeds from the United States to China, the sleek aerospace vehicle was envisioned to take off horizontally like an airplane, fly into Earth's orbit at speeds

80. "Commercial Hybrid Rocket Tested at SSC," *Lagniappe*, 19 November 1993, SSCHRC; "Hybrid Test Series Completed at SSC," *Lagniappe*, 21 November 1994, SSCHRC.

81. Bruce, interview; Mix, interview; Patrick Scheuermann, interview by Mack Herring, Picayune, MS, 22 July 1996.

up to Mach 25, and return and land at a destination on the far side of the globe in a matter of minutes. The NASP would, of course, have definite military and civilian utility.[82]

The project-hungry engineers at the SSC immediately sought program managers for the joint Air Force-NASA program. The SSC team offered to provide extensive laboratory and test facilities, 30 years of rocket-testing expertise, and the over 125,000-acre acoustic-buffer zone for the NASP program. Senator Stennis's office also took a keen interest in helping secure appropriate test missions within the NASP program for the south Mississippi facility. In May 1992, the SSC was selected by the joint Air Force-NASA program office to initially test new materials for the NASP that could withstand the tremendous changes in temperature that the vehicle would encounter as it performed its mission. Technical program directors decided that a High Heat Flux Facility (HHFF) would be needed at the SSC to accomplish the specialized testing of exotic materials. Upon the selection of the SSC for the NASP testing, Deputy Director Gerald Smith accurately called the decision "a major accomplishment in the expansion of the SSC propulsion test goal."[83]

After the planning and design work was accomplished, another test program was born when Air Force and NASA officials gathered on 16 September 1992 to break ground for the HHFF, located a short distance northwest of the CTF. Patrick "Pat" Scheuermann, acting manager of the NASP Project Office at the SSC, and Bill Taylor, associate director of the SSC, represented NASA at the NASP kickoff ceremony. Taylor, in a statement to the press regarding the $1.9 million, commented, "This project is the lynch-pin for putting in a test facility capability at the Stennis Space Center to support other propulsion programs around the nation."[84]

Although constructed to support materials development for the NASP, the facility evolved into a versatile test complex available for developmental projects involving hot gas, cryogenic fluids, gas impingement, inert gases, industrial gases, specialized (fluorine) gases, hydraulics, and deionized and industrial water. By the summer of 1994, the SSC engineers put a subscale, graphite-epoxy, liquid hydrogen fuel tank designed for the NASP through

---

82. "Stennis Selected for Space Plane Facility," *Lagniappe*, 21 May 1992, SSCHRC; Advanced Program Development Office, "Test Facilities Capability Handbook," High Heat Flux Facility, pp. 3.5-1 to 3.5-2.

83. *Ibid.*

84. "Stennis Center Builds Plane Test Facility," *The Sea Coast Echo*, 24 September 1992.

thermal structural tests. In the final analysis, the HHFF was another test facility project successfully designed and built by the SSC engineers that has and will add versatility to the test capabilities of the SSC and gave the Center of Excellence concept even more meaning and depth.[85]

RLV, EELV: Testing The Possibilities

As the SSC began to diversify its propulsion expertise in 1995 with knowledge gained from the SSME, CTF, and HHFF test programs, its managers used their new credibility to bring in more test activities of national significance to the SSC. With NASA and the nation's aerospace industry looking for more economical ways to achieve routine access to space and to eventually replace the aging Space Shuttle, the SSC offered its experience and unique facilities to attract test programs for the Reusable Launch Vehicle (RLV) and the Evolved Expendable Launch Vehicle (EELV). Technology from these developmental programs was expected to produce a "mixed fleet" for the nation's "highway to space."[86]

To accommodate the new test programs, the SSC established an RLV and EELV Project Office in May 1995. Lon Miller, director of the SSC Project and Technology Directorate, announced that Pat Scheuermann would head up the new office. In making the announcement, Miller said, "This program is of national significance and of critical impact to [the] SSC." Miller also stated he anticipated that all RLV testing would be performed at the SSC, no matter which aerospace firms were selected to develop the systems. As it turned out, a proposal by Lockheed-Martin was accepted.[87]

The RLV technology program stemmed from a 1993 NASA study, performed at the request of the Congress, that addressed the nation's future space transportation needs. The "Access to Space" study concluded that the most beneficial option would be to develop and deploy a fully reusable, pure

---

85. "Events That Shaped 1993," *Lagniappe*, 20 December 1993, SSCHRC; Picture Caption, Senator Trent Lott and Roy Estess, *Lagniappe*, 11 August 1993, SSCHRC; Advanced Programs Development Office, "Stennis Space Center Capabilities Handbook," High Heat Flux Facility; SSC engineers put a subscale, graphite-epoxy liquid oxygen fuel tank designed for the NASP through thermal structural tests during the summer of 1994.
86. Scheuermann, interview; Miller, interview; Roy Estess, interview by Lisa Monti, *Coast Magazine*, May June 1995, p. 27–28.
87. "SSC Forms Office for Future Testing," *Lagniappe*, 20 June 1995, SSCHRC.

rocket launch system incorporating advanced technologies. The RLV Technology Program called for a partnership between NASA and industry for world leadership in low-cost space vehicles. The objective of the program was to develop and demonstrate new technologies for the next generation of reusable space transportation systems that could radically reduce the spiralling costs of space access. In fact, engineers estimated that an RLV vehicle could take payloads into space at the cost of only $100 per pound, as compared to the Space Shuttle cost of about $1,000 per pound. The program outlined a combination of ground and flight demonstrations utilizing the X-33 experimental "flying testbeds." The X-33, a Lockheed-Martin wedge-shaped vehicle, was selected by NASA on 2 July 1996 as the RLV that would ultimately replace the Space Shuttle. When the vehicle is fully verified for flight, the X-33 will be turned into commercial or DoD aircraft for full-scale development.[88]

In support of the RLV testing, the SSC conducted its first static firing of a Technology Testbed (TTB) SSME-class engine on the A-2 test stand in April 1996. The first firing of the TTB was considered a milestone by Lon Miller in the SSC's role as the Agency's propulsion center and in its working relationship with the MSFC. The test proved that the two centers could work together on a propulsion program, even though they were located some 400 miles apart. In addition, the test demonstrated that the engine did not have to be physically attached to a test stand at the MSFC in order for the engineers in Huntsville to acquire their needed data.[89]

With the SSC scheduled for all development test programs associated with the X-33, activity at the installation was planned to continue through the end of 1999. The first series of tests on the RLV technology engine were completed in May 1996. Test stands phased-out of the ongoing SSME test program at the SSC were converted for use in the RLV testing program. By using the existing SSME test stands, the RLV program could be accomplished at the lowest possible cost. An additional bonus for the SSC was realized, since program requirements for the X-33 would bring testing to other facilities at the SSC, including the CTF and HHFF.[90]

---

88. NASA-SSC PAO Fact Sheet, "Reusable Launch Vehicle/Evolved Expendable Launch Vehicle Program," September 1995.
89. Miller, interview.
90. NASA-SSC PAO Fact Sheet, "Reusable Launch...", September 1995.

With NASA moving ahead with plans to develop a vehicle with engines tested at the SSC, (in July 1996) the DoD initiated a $2 billion program designed to focus on existing technology to develop a new family of EELVs. The EELV program would study foreign and domestic technologies, with an eye toward replacing current medium and heavy vehicles in the country's launch vehicle fleet. The objective of the EELV program was to reduce the nation's cost of DoD space launches. The SSC was selected to perform engine and system testing for one of the four companies vying for the EELV program beginning in 1996. Because of the large test infrastructure already in place at the SSC, the program would not have to invest in construction of new facilities.[91]

DTF: A School For Pioneers

The SSC engineers led by Marvin L. "Marv" Carpenter, deputy director of the SSC Propulsion Test Operations Office, constructed a "Diagnostic Testbed Facility" (DTF) in 1987 that used a small, 1,200-pound-thrust rocket engine salvaged from a surplus yard at the MSFC. The purpose of the facility was to learn how to detect potential problems in the SSMEs by analyzing spectral emissions in the engine exhaust plumes during a static firing. The first firings of the salvaged rocket engine at the DTF were conducted in April 1988 and continued with hundreds of successful firings at the facility, which expanded their research objectives.[92]

After the DTF became operational, Carpenter soon discovered another use for the homemade test facility. Carpenter and other senior SSC engineers knew that in modern rocketry procedures, there was little room left for engineers to get "hands-on" experience in engine testing. For years, NASA engineers monitored tests, while contractor engineers and technicians "pushed the buttons" and performed the actual testing.[93]

By encouraging the younger engineers to get involved by planning and conducting the tests themselves, the experience gave them a pioneering spirit

91. *Ibid.*
92. "Diagnostics Testbeds Facility Leads Way In Plane Research," 18 August 1989, *Lagniappe*, 18 August 1989, SSCHRC.
93. Carpenter, interview.



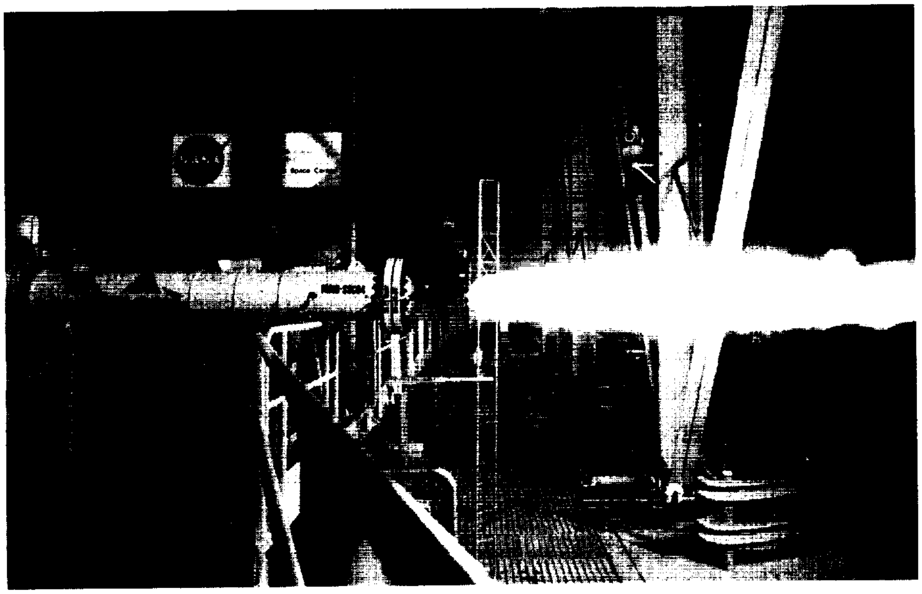
Roy Estess, director of the Stennis Space Center (second from right), talks with NASA propulsion engineers at the E-1 Test Facility. From left are: Bill Kahle, Steve Nunez, Jim Taylor, Estess, and Scott Dracon. (SSC-94-403-23)

that was hard to find elsewhere in NASA. Since these engineers and their supporting technicians were destined to be the test managers of the future, the DTF turned out to have the added utility of becoming a "finishing school" for propulsion engineers. With the influx of new engineers in 1991, the training program became even more important and took on a "higher visibility" and more formal plans and procedures were adopted. Dr. Don Chenevert became program manager of the DTF. The facility has also been used by other NASA research centers, private aerospace firms, and universities to do plume-research studies.[94]

In 1991, Pat Mooney, chief of the Test Operations Division, wrote a memorandum to J. Stephens "Steve" Dick, chief of the Test Support Division, soliciting assistance for the low-funded DTF. The memorandum read, "In the past 3 and 1/2 years, the DTF has had to rely solely on parts and components that had been scrounged from many different areas of the site. . . Any efforts of [SSME] test support division's part to include these components in planning related to SSME spares or even monies left over would be a great help to the DTF." The Mooney memorandum illustrates the informal associations enjoyed by members of the SSC team, dating back to the mid-1960s when many of the engineers were working together during the Saturn V testing era.[95]

94. *Ibid.*; Scheuermann, interview.

95. Pat Mooney to J. Stephens "Steve" Dick, memorandum, "Spare Components for the DTF," 23 August 1991.



The test-firing of a commercial hybrid rocket motor is one example of Stennis Space Center's partnership with private companies for propulsion development testing. A 10,000-pound-thrust hybrid rocket motor undergoes a test-firing in 1994 at Stennis Space Center's E-1 test Facility. The E-1 Test Facility shown above was formerly known as the Component Test Facility. (SSC-94-707-6)

With the extensive experience gained during the first part of the 1990s with the many varied test projects, the foundation was laid for the SSC to finally be formally recognized as the nation's Center of Excellence for Propulsion Testing. Indeed, during NASA Administrator Daniel Goldin's first visit to the installation, he challenged the SSC to be the "best test center in the world."[96]

Formal recognition as NASA's Center of Excellence for rocket propulsion testing eluded the SSC until 1996. Agency planning documents, vision statements, and discussions publicly pronounced the honor for the SSC, but Estess and his team wanted to see an official proclamation, with programs and appropriate funding to support the designation. After all, the SSC felt it obtained the Center of Excellence honor the hard way, "they had earned it."[97]

96. "Goldin Visits Stennis Space Center—New Chief Challenges Facility to be the Best in the Word." (Gulfport, MS) *Coast Business Journal*, 27 April 1992.

97. J.R. Thompson, "Roles and Missions Report," 8 November 1992, p. 2.

In The Market Place

NASA's Commercial Remote Sensing Program (CRSP) at the SSC provided a new approach to the application of remote sensing, an "old" space technology largely developed in the civilian sector by the Earth Resources Laboratory (ERL) in the 1970s. The military had used remote sensing techniques for years, but kept the new science "behind closed doors."[98]

When the ERL was established in 1970, researchers began studying ways to apply the new information gained from airborne and space platforms, such as satellites and spacecraft. Through a combined use of ground truth, geographical information systems, and a unique and innovative computer program called Earth Resources Laboratory Applications Software (ELAS), the ERL scientists were able to input, study, and identify hundreds of data points of a particular location on Earth.[99]

The ERL scientists assisted a broad spectrum of users in finding practical applications for the remotely sensed data. The data were used by farmers, geologists, city and state planners, environmental monitors, fishermen, firefighters, foresters, law enforcement officers, and road builders. As was discussed earlier, even archaeologists were able to greatly advance their explorations by using remote sensing information.[100]

The Regional Applications Program (RAP), headed by Roy Estess during the latter part of the 1970s, was a landmark program that enabled remote sensing data to assist the 17 Sun Belt states in their planning and decisionmaking processes. ERL personnel became extremely "customer-oriented" as they marketed and then trained users from Mississippi and Louisiana in the use of the remote sensing data.[101]

One of the young scientists working on RAP's outreach venture to the Sun Belt states was David P. Brannon, an Alabama native recruited by Estess from

---

98. NASA-SSC Fact Sheet, "Commercial Remote Sensing Program Office," June 1996; David Brannon, interview by Mack Herring and Myron Webb, 6 May 1996.

99. "ELAS Selected for Hall of Fame Honors," *Lagniappe*, 19 March 1996, SSCHRC; "As Mathematician Stereotype, Pearson Does Not Compute," *Lagniappe*, 25 April 1980, SSCHRC; NASA-ERL Mission Statement, 1970; The ELAS was selected by the U.S. Space Foundation's Hall of Fame in 1992.

100. Brannon, interview; "Kentucky Considers Landsat Data To Monitor Natural Resources," 8 February 1979; NASA-NSTL News Release, "NASA, University of Colorado-Boulder Study Peruvian Andes Area," 9 May 1985, SSCHRC.

101. Brannon, interview; "Regional Symposium Provides 'Open Forum' for Data Users," *Lagniappe*, 21 November 1979, SSCHRC.

the Navy. Brannon recalled the demise of practically all federal "applications" programs in 1981, when the Administration sought to put a greater emphasis on commercially focused programs and "get the government out of private business." Although ERL's applications endeavors actually assisted private enterprise entities, the very word "applications" was enough for budget directors to "zero out" the RAP and other similar projects in the government.[102]

This setback caused Brannon and others to take stock of their applications work and see where they might have made mistakes, with an eye toward improving their approach. According to Brannon, Roy Estess told the RAP personnel to keep up their work in spite of increasing budgetary constraints and "we'll live to fight another day." Brannon also recalled some earlier advice from Wayne Mooneyhan, ERL director, to continue their civil service "hands-on" management approach and maintain their technical expertise, because the changing times would bring new programs in the future "if we are ready." The support of SSC Director Jerry Hlass during the 1980s was also crucial to survival of the remote sensing programs and their ultimate success.[103]

As the ERL remote sensing team appraised their future moves, the SSC scientists also knew that they would have to make "semantic" changes in their programs in order to obtain funding. For instance, the word commercial was "in," and the word applications was most definitely "out." During the ERL's Regional Program days, Brannon and his colleagues had a lot of "answers" with their technology, and they went about searching for problems to match their answers. Brannon has recalled that he and his colleagues attempted to transfer technology that the general population was unprepared to receive. In developing the CRSP, Brannon and his fellow scientists adopted a new approach and began asking the customers what their "needs" were and then tried to match those needs with the appropriate technology development program.[104]

Brannon remembered an encounter he had years ago during his travels with the RAP. While working with the various states, Brannon was sent to North Carolina to convince the state's many organizational departments that

---

102. David Brannon, Vitae, "Program Manager, NASA Commercial Remote Sensing Program Office," ud.; Brannon, interview; Jerry Hlass, "NSTL Goals And Objectives," 1 April 1985-31 March 1986.

103. Brannon, interview; "Proposed Program Initiative for Commercial Earth and Ocean Observations," July 1985, SSCHRC.

104. *Ibid.*

they should adopt remote sensing techniques to help them better manage their resources. The young 24-year-old scientist, who had not totally developed his skills in salesmanship, used scores of photo transparencies to illustrate the uses of remote sensing in such areas as forestry and land-use planning. After a long and complex presentation, one of the North Carolina administrators, in a deep southern drawl, asked, "Son that's all well and good, but can you just tell us where the trees are?" Brannon said he had touched briefly on the subject of trees, but he knew that he did not connect with the gentleman's perceived needs. "I never forgot that lesson," Brannon mused knowingly, "to always understand just what the client needs."[105]

With many other such experiences under their belts, Brannon and his associates were pleased when the SSC was named NASA's Lead Center for "Commercial Remote Sensing" in May 1988, a designation later recognized by Administrator Goldin. At that time, the Agency was implementing programs suggested by the Administration and the Congress. NASA Headquarters recognized that members of the ERL had developed excellent customer relations skills. The Lab personnel had become quite adept in "customer relations," an ability that government scientists and researchers rarely possessed.[106]

In 1984, the federal government took steps that had far-reaching effects for the commercial programs at the SSC, and he encouraged NASA Headquarters's management to consider the SSC's reputation in commercial remote sensing. There was an amendment to the National Space Act of 1958 to accommodate the "Commercial Uses of Space." Also, the Congress decided to turn the operational management of the Landsat satellite's products over to private enterprise. Both of these legislative actions favored the customer-oriented experience of the scientists at the SSC.[107]

As their fortunes changed, the innovative Brannon; his capable deputy, Charles "Chuck" Hill; and other associates put another remote sensing program in place at the SSC in 1987 that better fit the growing trend toward entrepreneurship beginning to blossom in the business community. This time, the remote sensing team turned the program around and formed investment

105. D.W. "Wayne" Mooneyhan, interview by Mack Herring, Picayune, MS, 5–6 April 1996; Brannon, interview; P.K. "Pat" Conner, interview by Mack Herring, Petal, MS, 2 April 1996.

106. Brannon, interview; Pete Marwick, "Marketing Requirements for Spatial Observations Systems," KPMG, Denver, CO, 1–3 March 1994, transcript in SSCHRC.

107. *Ibid.*

partnerships with companies that presented a good proposal outlining their "need" for remote sensing products and services.[108]

Brannon and his people then matched this need for remote sensing products and services with newly developing technology. Called the Earth Observations Commercial Applications Program (EOCAP), the "results-driven" partnerships were open primarily to U.S. commercial firms. The EOCAP also had categories for educational institutions, nonprofit organizations, and other government agencies. By July 1996, the EOCAP had worked with over 400 entities, including 25 companies marketing cutting-edge products around the country. The commercial "marketeers" and scientists at the SSC had also instituted a "Visiting Investigator Program" (VIP) that proved to be successful. In VIP, the CRSP personnel invite private businesses to come to the SSC and study how they can use remote sensing in their companies. The program, expanded in 1996, also focuses on colleges and universities interested in using the remote sensing technology developed in the user-friendly laboratories at the SSC.[109]

Reinventing Government: A Return To Synergy

Since the founding of the multiagency complex at the SSC in 1970, a number of scientists have worked together, helping each other find answers to their shared technical problems. It is not uncommon to see a NASA remote sensing specialist working hand-in-hand with a U.S. Park Service researcher on a project to inventory the natural resources of a particular national park. In the Skylab Gamefish project, NASA scientists and National Marine Fisheries personnel gathered "ground truth" from the Gulf of Mexico, to correlate with the photographs from Skylab, in an effort to determine better methods to track and catch fish. The SSC scientists also assisted U.S. Geological Survey scientists studying new ways to advance oil exploration by using satellite remote sensing. There were many other joint projects successfully undertaken through the years, sometimes with several agencies participating in a particular scientific endeavor.[110]

---

108. NASA-SSC PAO Fact Sheet, "Earth Observations Commercial Applications Program," 1 October 1995.
109. Brannon, interview; Marwick, "Marketing Requirements..."
110. NASA-ERL Organization Chart, 1972; D.W. "Wayne" Mooneyhan, interview; Gil Webre, "MTF's Role in the 1970s: Space Technology," *The Times-Picayune*, 8 July 1973.

When Vice-President Al Gore proposed that the federal government find ways to "reinvent government," NASA/SSC personnel pointed with pride to a slogan, "The Stennis Space Center has been reinventing government for 25 years," they had "coined" for a presentation. During the early years of Jackson Balch's efforts to bring several federal and state agencies together to study space technology, oceanography, and the environment, he said the multiagency concept produced a situation where scientists could "make 2 plus 2 equal 5." Balch's idea of a scientific utopia would have ideally had several agencies at the installation working on their own projects, but also sharing information that would enhance each other's results.[111]

One of the reasons for the creation of NASA's Application Engineering (AE) office in the 1970s was to put into place a NASA element that had the expertise and charter to relate with the resident agencies. After Balch, Jerry Hlass recognized the importance of the multiagency concept and instituted policies that he called "tenant satisfaction," but the multiagency complex had never reached its "ultimate" potential. Similarly, Roy Estess provided a constant source of support for the various agencies through the many personal and professional associations he enjoyed during earlier years. When Estess was named the SSC director, many heads of the resident agencies and their key technical managers found an open ear and a friend in the director's office. Estess had been the manager of the AE office that worked across the board with the resident agencies. He was also manager of the RAP, which dealt with the numerous departments of 17 state governments, and he helped champion the development of the Mississippi Technology Transfer Center. Estess had his "heart" in the resident agency concept, and as the SSC director he adamantly declared his support of the concept he helped Jackson Balch create and build during the 1970s.[112]

Estess underscored his feelings about the value of the multiagency concept when he placed several highly respected scientists in an SSC organization that could continue the proven cultural tradition of cooperation between the federal and state entities at the facility. Indeed, Estess wanted to see the "crossroads of science" concept at the installation finally live up to its original expectations.[113]

---

111. NASA-SSC Presentation, "Pathworks," 14 September 1995; Jackson Balch, interview by Gateway Productions, Bay St. Louis, MS, 10 December 1974.

112. NASA-NSTL Office Of Applications Engineering, "Management Review for Jerry Hlass," 27 August 1976; Estess, Biography; Estess, interview, 7 July 1995; Estess, interview, 24 April 1996.

113. NASA-SSC Organization Chart, 16 February 1994; NASA-SSC Organization Chart, 18 July 1996.

Estess named oceanographer Dr. Richard L. "Rick" Miller as chief of the Earth Systems Science Office, encouraging the office to share its extensive expertise with the several resident agencies located at the SSC. In addition to his own scientific background, Miller's organization included some of NASA's most respected scientists in their areas of investigation. For instance, Dr. Tom Sever, NASA's only archaeologist, had gained international recognition for the application of remote sensing to explore ancient civilizations. Sever's work with *National Geographic*, the University of Colorado, and many other prestigious organizations brought attention to the uses of space technology and credit to the Agency for its pioneering work in a very visible and fascinating science. Others working in the SSC science office included Dr. William "Bill" Cibula, a senior scientist from the ERL organization, and Dr. Gregory "Greg" Carter, a well-published researcher. Cibula and Carter were recognized with Space Act Awards in 1994 for their use of remote sensing data to study the effects of stress on vegetation.[114]

The multiagency complex gave the SSC scientists an added credibility when they were engaged in discussions with other researchers. "When I go to NASA Headquarters to discuss oceanography," Miller pointed out, "I not only bring our SSC experience to the table, I also bring the entire expertise of the world-renowned Naval Oceanographic Program located at [the] SSC along, because my colleagues in the Agency now know of our association."[115]

Rear Admiral Paul G. Gaffney, II, Commander, Naval Meteorology and Oceanography Command, went a step further in asserting his beliefs in the multiagency concept. Gaffney, who began his association with the installation in 1975 as an executive assistant and aide to the Oceanographer of the Navy, said, "I want to collaborate with people in the other agencies here on a daily basis, where we can learn from them, and they can learn from us, and we can all get better."[116]

---

114. Mooneyhan, interview; NASA-SSC PAO Biography, "Tom Sever," ud. circa 1996, SSCHRC; Arthur A. Demariest, "The Violent Saga of A Maya Kingdom," *National Geographic*, vol. 183, no. 2, Washington, DC, February 1993, pp. 95–111; "Scientist at SSC Discover New Method of Detecting Plant Stress," *Lagniappe*, 20 January 1995, SSCHRC; Gregory A. "Greg" Carter, "Responses of Leaf Spectral Reflectance to Plant Stress," *American Journal Of Botany* vol. 80, no. 3, 1993, pp. 239–243; William G. "Bill" Cibula and Maurice O. Nyquist, "Use of a Topographic and Climatological Model in a Geographic Data Base to Improve Landsat Mutli-Spectral Scanner Classification for Olympic Park," *Potogrammetric Engineering And Remote Sensing*, vol. 53, no. 1, January 1987, pp 66–75.
115. Richard L. "Rick" Miller, interview by Mack Herring and Myron Webb, SSC, MS, 6 May 1996.
116. Rear Admiral Paul G. Gaffney, II, interview by Mack Herring and Myron Webb, SSC, MS 13 April 1996.

For instance, Gaffney pointed out, "I would like to see oceanographers working on NASA's Mission to Planet Earth down here." Gaffney championed his concept of interagency cooperation in discussions with the heads of other agencies at the SSC and during many discussions with Roy Estess. Gaffney also carried his message of sharing and growth to community leaders and others interested in the Mississippi installation's future. He had not only been an active participant in activation at the SSC, he also took keen interest in Gulf Coast community affairs as a resident of nearby Diamondhead.[117]

In addition to advancing the SSC science programs through the multi-agency sharing concept, Miller believed the Science group should pursue a focus on "coastal research," an area that the ERL was originally chartered to develop when the Lab was first established at the site in 1970. Miller stated that the SSC's location near the mouth of the Mississippi River and the Gulf of Mexico qualified the facility for an emphasis on coastal research because of its strategic physical location alone. He also pointed out that the SSC scientists had gained a special experience in coastal zone research because of their 25-year involvement in studies of the coastline. These remote sensing coastal studies involved work with federal and state agencies, oil companies, and even private entities such as "Ducks Unlimited."[118]

Miller noted that the majority of people in the county lived within 50 miles of the nation's coastlines, indicating even more reason for an emphasis on coastal research. A good example of the SSC's involvement in coastal research and multiagency sharing came when scientist Dr. Ramona Pellietier Travis, NASA's Gulf of Mexico Program manager at the SSC, participated in a planning effort with the SSC intragovernmental Gulf of Mexico Program to assess damage caused by Hurricane Opal, which struck the Florida Panhandle on 4 October 1995.[119]

The Gulf of Mexico Program, headquartered at the SSC, was organized to develop a comprehensive management plan for future protection of the Gulf environment. The program is a partnership among Gulf states and public and private agencies designed to prevent duplication, improve coordination,

---

117. *Ibid.*

118. Merna Bridgeman, Swamp To Space, "Project Studies Effects of Land Use on Coastal Environment," *The Times-Picayune*, ud.

119. Miller, interview; "Quick Thinking Allows NASA to Provide Hurricane Data to Gulf of Mexico Program," *Lagniappe*, 23 October 1995, SSCHRC.

and provide a comprehensive network for sharing Gulf of Mexico environmental information data. Dr. Travis noted after a coordinated fly-over by a NASA aircraft of the hurricane-ravaged area, "One thing NASA brings to the table as a partner is its remote sensing technology. This [fly-over] was an excellent opportunity not only for NASA to demonstrate its capabilities, but also to exhibit the importance of the Gulf of Mexico Program partnerships." The ER-2 NASA airplane, using sophisticated airborne sensors, was able to acquire essential data in less than 48 hours after the hurricane made landfall. In May 1996, Travis was also looking into the prospect of providing resource information and data for a Gulf of Mexico study aimed at increasing shellfish along the Gulf Coast from Texas to Florida.[120]

With leaders such as Admiral Gaffney and Roy Estess supporting the cooperation and the active participation of the resident agencies in partnerships and joint programs, the new directions in which Miller wanted to take the science program seemed timely. Although the ERL left many legacies, its early work in coastal research was perhaps the most significant. In the summer of 1996, federal and state scientific agencies across the nation were seriously looking toward coastal studies as their single, most important endeavor. The coastal research trend represented a "return to the 1970s," when the ERL was formed at the SSC with one of its main missions to begin using remote sensing techniques to study the Gulf of Mexico waters along the Mississippi and Louisiana coastlines.[121]

Technology Transfer: Down To Earth Science

Although the transfer of space technology from the SSC over the years has helped numerous private enterprise entities around the country, the states of Mississippi and Louisiana have clearly been prime recipients of new innovations from the south Mississippi installation. Since the early 1970s, Louisiana and Mississippi have maintained technology transfer offices at the SSC. Through these offices, SSC technology and expertise have assisted the

---

120. *Ibid.* "The Shellfish Challenge: Gulf of Mexico Program Ambitious Restoration Goal," *Lagniappe*, 22 May 1996, SSCHRC.

121. Miller, interview.

two states in flood control, forestry management, coastal-zone studies, and numerous other areas.[122]

The SSC Technology Transfer Office has aided small and large business concerns, medical institutions, and Gulf Coast fishermen. Community Coffee; Picayune, Mississippi's Delta Data Systems, Inc.; Mississippi Power Company; and the Louisiana Power and Light Company are a few of the hundreds of private companies that have used technology derived from the SSC-developed programs. In addition, NASA technology has shown up in products ranging from dog biscuits to smoke detectors. The SSC personnel have helped in the development of devices to improve eyesight of visually impaired people and in medical diagnostic tools, such as the nuclear magnetic resonance imaging scan. The SSC scientists and engineers have contributed to industries using NASA spin-off technology, creating more than 13,000 new jobs nationwide.[123]

The Mississippi Technology Transfer Center building, completed in 1987, has been a showplace for technology transfer supporters nationwide. Housed in the same building are elements of NASA, Department of the Interior, U.S. Navy, Environmental Protection Agency, Department of Commerce, and offices representing Mississippi State University and the State of Louisiana. The Mississippi Technology Transfer Center allows the State of Mississippi to have its own technology transfer offices right in the heart of the SSC, sharing cutting-edge innovations with 22 federal and state agencies involved in more than 25 scientific disciplines.[124]

During the first year of his tenure as director, Roy Estess moved to strengthen SSC technology ties with Mississippi and Louisiana. Estess joined with MSFC Director Jack Lee and Louisiana Governor Buddy Roemer to sign an agreement in October 1989 designed to make space technology more available to Louisiana. The SSC director, who had worked closely with the two states for years, joined with Lee and Mississippi Governor Ray Mabus on 8 December of the same year to enter into a similar pact with Mississippi. Estess named Robert "Bob" Barlow, long-time

---

122. Estess, interview; Miller, interview; "Stennis Scientist Studies the Birth and Death of River Deltas," 17 April 1990; "Forests Play Vital Role in Climate Control," *Lagniappe*, 21 November 1992, SSCHRC; Rick Galle, "Technology Transfer," *Picayune Item*, 30 May 1990.
123. Galle, "Technology Transfer," *Picayune Item*, 30 May 1990.
124. *Ibid.*

promoter of technology utilization, as the coordinator for the project to implement the agreements. Estess continued to use his office to support technology transfer programs and demonstrated his favor for the programs in July 1996 by creating a separate Technology Transfer Office.[125]

In The Public Domain

The decade of the 1990s has brought changes and innovations in the SSC's approach to public programs. True, most of the traditional public information, community relations, and education programs developed during the first three decades of the SSC's history are being continued in the 1990s. But, Roy Estess and his public affairs and education teams have updated and polished old programs and initiated new innovations geared to meet the changing public interests of a new generation.[126]

In January 1990, Estess assigned Mack Herring, veteran Public Affairs Officer, to design a program to preserve the "rich history of the Stennis Space Center." At the same time, Estess appointed Ms. Myron Webb, a Gulf Coast native and graduate of the University of Southern Mississippi as the new SSC Public Affairs Officer. Webb, who was well known to NASA and many resident agency personnel as the University's liaison coordinator with the SSC, joined NASA in 1985 as a Public Affairs Specialist working with Mack Herring. As Public Affairs Officer, Webb and her team have created and implemented numerous education and public relations programs at the south Mississippi facility.[127]

Estess has a natural ability to communicate with people, as was evident first in his "marketeering" work for Balch, then as director of the RAP, and as a representative of the SSC as its deputy director from 1980–1989, and then when he was selected as the installation's fourth director. A veteran of many press conferences, Estess has always believed in an "open" public information

---

125. "NASA Centers Sign Agreement with State of Louisiana," *Lagniappe*, 22 November 1989, SSCHRC; "NASA Signs Agreement with State of Mississippi," *Lagniappe*, 15 December 1989, SSCHRC; Alexis de Tocqueville, *Democracy In America* (New York: The American Library, Inc., 1956), pp. 163–168.

126. Estess, interview.

127. NASA-SSC Personnel Announcement, "Mack Herring to Develop SSC History," 13 January 1990, SSCHRC. This date marked the beginning of the History Program/Office at the SSC. Roy Estess asked the author to "develop the rich history of the Stennis Space Center." The gathering of materials for an archives began immediately and the research and writing for this text began on 12 October 1994.

policy and is supportive of education and community programs. In his personal time, Estess has been a person who could be counted on in his hometown of Picayune, Mississippi. In fact, he was chosen as Picayune's "Man of the Year" and was cited for his contributions to the community, his church, and as a Boy Scout leader.[128]

The SSC director and his technical managers saw "first hand" the need for good communications programs when they encountered resistance from community members who opposed the ASRM program because of a perceived negative environmental impact. Estess personally led a proactive public and community relations communications effort to help the public better understand the ASRM situation, pointing out that the solid rocket motor could be static-fired at the SSC without putting people or the environment in harm's way. Further, he supported Webb in her efforts to further strengthen relations with community and educational leaders.[129]

Because of Estess's willingness to fully delegate duties to members of his staff, Webb has had a relatively free hand to initiate her own public programs. In April 1989, Webb was instrumental in the implementation of a community involvement education program called "Coast Encounters." Through the education program, NASA education specialists visited 115 schools and addressed more than 65,000 students along the Mississippi Gulf Coast. Webb, however, found an energetic educator to assist her with this as well as other innovative educational programs in Cheryl Bennett, the former coordinator of the John C. Stennis Space Center's Teacher Resource Center. Ms. Bennett, an information services supervisor, was deeply involved in the planning and implemention of the community involvement programs between NASA and Mississippi and Louisiana schools.[130]

The SSC celebrated its 30th Anniversary—marking the day of the initial announcement of the rocket test center on 25 October 1961—by unveiling a

---

128. NASA-SSC PAO, "Estess Biography;" Estess, interview.

129. Human, telephone interview; "NASA Officials Meet the Press to Answer Questions on ASRM, *Lagniappe*, 22 November 1989, SSCHRC.

130. NASA-SSC PAO, Fact Sheet, "Early Education Monday, April 1991; Hlass, "Management Concept . . . ," p. 24; Webb, interview; Because of her contributions to the Gulf Coast community, Myron Webb was the first SSC employee chosen for the "Leadership Gulf Coast" program for future leaders in 1992–1993. She also served on the LGC Board, 1993–1996; the Hancock County Chamber of Commerce Board, 1994–1996; and as NASA's representative to the Gulf Coast Chamber of Commerce, 1994–present; NASA News Release, "Bio Information on NASA Community Involvement Representatives," April 1989, SSCHRC.

newly designed and refurbished Visitors Center. Webb still points with pride to the fact that approximately 30,000 school children come to the Visitors Center each year.[131]

The charismatic public affairs officer was especially pleased that the civil service and contractor public affairs team developed specialized education programs, approved by the State Board of Education, for children from preschool ages through 8th grade. In fact, several Johnson Control World Services tour guides at the Visitors Center received awards from NASA Administrator Truly for developing and implementing an extremely popular, unique program for preschoolers and kindergartners.[132]

In May 1993, with community relations and interest in education at an all-time high, the SSC joined with its Gulf Coast neighbors to host the opening ceremonies for the 44th Annual International Science and Engineering Fair. This hugely successful science fair drew 829 students and science fair finalists from around the world. Over 2,500 students, their parents, and Gulf Coast leaders came to the SSC on 10 May to enjoy an old-fashioned barbecue and to witness a Space Shuttle engine firing on the B-1 test stand. Director Roy Estess told the young scientists that "science and engineering are the core of everything we do at NASA, and science and engineering are the international currency of our modern technological role." Estess reminded the students of the "endless opportunities and challenges" in their future. A tremendous afternoon thunderstorm left the entire visiting group soaking wet. The heavy rains, however, did not dampen the spirits of one of the SSC's most significant and special events.[133]

Another education initiative was started in 1991 when NASA was preparing to manufacture the ASRMs. Called the Tri-State Education Initiative, the project, sponsored by NASA, involved a consortium of 30 schools in Alabama, Mississippi, and Tennessee organized to work cooperatively to enhance and broaden the capabilities of their respective educational programs within the tri-state area. The education initiative continued to draw national attention for its innovations in cooperative education long after the ASRM project was terminated. Dr. David Powe, former president of Mississippi Delta Community

---

131. "A Special Day for the Entire Family," *Lagniappe*, 20 November 1991, SSCHRC.
132. Webb, interview.
133. "2,500 Attend ISEF Opening Ceremony At Stennis," *Lagniappe*, 20 May 1993, SSCHRC.

College, was appointed by NASA as the project manager. The Tri-State Education Initiative, used as a national model for systematic educational reform, was cited by U.S. Department of Education Secretary Richard W. Riley in July 1996 for "leadership in education reform." While the SSC-supported education initiative flourished in the northern part of the state, public opinion of NASA's SSC continued at a high level in the surrounding area.[134]

From this proactive effort, there stemmed a strong partnership between the SSC and an organization known as the "Partners For Stennis." The group, composed of community leaders from all three Mississippi Gulf Coast counties and St. Tammany Parish, Louisiana, was originally organized in September 1994 as a result of mutual concerns and a need to be prepared to address any potential efforts to include the Navy elements at the SSC in the national military downsizing actions. The group immediately decided to maintain an active effort to support and enhance development of the numerous agencies located at the SSC. As the Partners group evolved, it also became a resource group to help businesses that may have the potential to locate at the SSC or in the Gulf Coast area.[135]

The Partners For Stennis organization hosted a community dinner to honor NASA Administrator Daniel Goldin during his 12 April 1995 visit to the SSC and the Gulf Coast. The event, held at the Great Southern Club in Gulfport, Mississippi, offered Goldin an introduction to the aggressive and influential Partners organization that supported the SSC and its programs. Goldin, pleased at the large turnout for the dinner, showed his appreciation when he was dubbed an Honorary Mississippian by Jimmy Heidel, executive director of the Mississippi Department of Economic and Community Development.[136]

During his speech, the enthusiastic Goldin invited members of the group to "come to Washington, D.C. and talk to your legislative delegation." A short time later, Goldin was walking through the U.S. Capitol when he met Dave Truetel, Jr., chairman of the Partners group; Irma Cry, executive director of the Slidell Area Chamber of Commerce and vice-chairman of the Partners group; and other members of the Partners group. When Goldin asked, "What are you doing up here?," they replied that they were taking his advice and vis-

134. NASA-SSC News Release, "NASA Announces Appointment of Program Manager for Tri-State Education Program," 22 November 1990, SSCHRC.

135. "Partners for Stennis Hold News Conference," *Lagniappe*, 22 March 1995, SSCHRC.

136. Partners For Stennis Dinner Program, "Dan Goldin, NASA Administrator," 12 April 1995.

iting their congressional delegations and those of other states, as well, to inform them of the benefits of the space program. No doubt the NASA Administrator made a mental note of the strong community support that the SSC had in this "booster" organization.[137]

In December 1990, at the end of his first year as SSC director, Roy Estess proudly announced that the facility had exceeded its Combined Agencies Campaign charity drive goal by contributing $217,056 to benefit charity organizations in the local Gulf Coast communities. Also, a Mississippi State University economic impact study was released in March 1990 that revealed personal income in the local area was $452.7 million in 1989 as a direct, and indirect, result of the SSC operations. The report also stated that the workforce in 1989 at the SSC numbered 5,500 people, with the majority living in Hancock, Harrison, and Pearl River Counties in Mississippi, and in St. Tammany Parish, Louisiana. A similar study, conducted in 1995 by the University and released in January 1996, showed that the SSC contributed $432 million in personal income to the communities within a 50-mile radius of the installation.[138]

The two economic impact figures were astonishingly similar after six years of changes, government downsizing, and the stunning loss of the Mississippi Army Ammunition Plant (MSAAP). But, even with the closing of the Army plant, the SSC stabilized and even began showing a slight growth—with 3,531 employees. In fact, in July 1996, the congressional delegation, the Partners For Stennis organization, and other community officials were looking for new tenants for the huge plant, formerly occupied by the Army, on the northern portion of the SSC complex. Another mark of community participation was noted when the SSC government and contractor employees contributed more than $180,000 to the Combined Agency Campaign charity drive in 1995.[139]

The leadership of Roy Estess at the SSC was recognized when the Mississippi legislature adopted a joint resolution in March 1996 citing the SSC director's many years of service to his community, his state, and his

---

137. Webb, interview by Mack Herring, SSC, 5 July 1996.

138. "Stennis Center Employees Exceed CAC Goal," *Lagniappe*, 15 December 1989, SSCHRC; "Stennis Space Center Makes Big Impact on Local Economy," *Lagniappe*, 16 March 1990, SSCHRC; "Stennis Has Impact of $411 Million," *Lagniappe*, January/February 1996, SSCHRC.

139. *Ibid.*

nation. The resolution also expressed the state's appreciation to Estess for the "many outstanding advancements on behalf of education and youth made in the State of Mississippi under his tireless leadership, guidance, and support." The recognition of the legislature was timely and well deserved.[140]

From the very first day that Estess worked as a test engineer at the Mississippi Test Facility in 1966, he, like Senator John C. Stennis, was proud that his home state had the opportunity to participate in "greatness" at the NASA installation located only 100 miles from his birthplace of McComb, Mississippi. Like many other Mississippians at the SSC, Roy Estess stuck with the facility through "thick and thin," never seeking career opportunities elsewhere. Estess, along with his Mississippi colleagues, always gave "the place" his very best as he worked to raise the facility to an even higher level of excellence.[141]

Of course, Estess was pleased that the Mississippi Legislature honored him with the joint resolution, even though the modest director was humbled to the point that when he returned to the SSC he stuck the resolution in his desk and did not tell anyone of the honor—not even Louise Porter, his trusted friend and executive secretary. Estess, no doubt, was proud that the SSC was moving ahead within NASA and on the homefront. At the same time, Estess approached his duties, during the spring of 1996, with "guarded optimism" because he felt he and his colleagues had "miles to go," in the topsy-turvy work of changing times, budget cuts, and downsizing of government, before they could rest on their "Center of Excellence" laurels.[142]

140. State Of Mississippi, "House Concurrent Resolution, No. 128" 27 March 1996.

141. John Seiley, video interview by Rex Cooksey and Johnny Mann, October 1991, tape in SSCHRC.

142. Louise Porter, interview by Mack Herring, SSC, 9 July 1996; Roy Estess, interview by Mack Herring SSC, 24 April 1996.

CHAPTER 15

For Future Generations

The Stennis Team

No one knew better than Roy Estess that "it was the people more than anything" that really mattered when it came right down to getting the job done, "where the rubber meets the road." As the Stennis Space Center (SSC) hit the home stretch in the 1990s in quest of another level of achievement in the NASA family, Estess knew his organization was on the right track with the focus on the prize of becoming the "Center of Excellence for Rocket Propulsion Testing."[1]

After all, NASA Administrator Dan Goldin had challenged the youthful SSC crew in April 1992 to become the "best test center in the whole world." Their old friend, J.R. Thompson, had laid down an earlier proposal, later endorsed by Admiral Truly in November 1991, that the SSC, with its unique buffer zone, test facilities, and highly experienced personnel, become the Agency's prime rocket test center.[2]

---

1. Roy S. Estess, interview by Mack Herring and Ms. Myron Webb, SSC, MS, 24 April 1996, tapes and notes in Stennis Space Center Historical Records Collection (henceforth referred to as SSCHRC); "New Stennis Director Roy Estess," *Lagniappe*, 16 February 1981, SSCHRC.
2. "Goldin Makes Initial Visit To SSC," *Lagniappe*, 20 April 1992, SSCHRC; J.R. Thompson, "Roles And Missions Report," 8 November 1991; "Goldin Visits Stennis Space Center: New NASA Chief Challenges Facility To Be Best In The World," (Gulfport, MS) *Coast Business Journal*, 27 April 1992.

With many successes in capturing the Agency's lead role in rocket testing, Estess was also aware that he had other programs and gifted employees in the commercial remote sensing and Earth sciences areas who needed nurturing in the changing culture of the SSC and at NASA Headquarters in Washington, D.C. In NASA's long-range strategic plan, SSC had specific goals to support an "enterprise," or line of business, as the lead center for propulsion testing. Other NASA enterprises, or lines of endeavor such as "The Mission to Planet Earth" and the "Space Technology Enterprise," were important areas where the SSC scientists and engineers had the expertise to make significant contributions.[3]

In fact, the SSC scientists, engineers, and researchers were among the nation's leading experts in commercialization of remote sensing technology. To bring his installation more in line with changing national priorities, Estess adjusted his SSC organization in the summer of 1996 to allow the SSC team the opportunity to become effective in meeting these new challenges. The new organization called for separate elements with a Commercial Remote Sensing Office, an Earth Systems Science Office, and a Technology Transfer Office. These organizations would answer straight to the SSC director's office. The new organization also added strength to its "Propulsion Test Directorate" and "Center Operations and Support Directorate."[4]

Most scientists and engineers at the center felt that the new organization, effected by Estess and the senior staff, provided them the ability to better utilize their expertise and was a step in the right direction to participate in the ever-changing technical culture sweeping the nation and the countries of the industrialized world. The SSC personnel also believed the new directions enabled them to better use the rapidly developing technology available to them.[5]

For instance, Dr. Greg Carter, a scientist who joined the SSC organization in 1987 as a member of the Earth Resources Laboratory (ERL), said he strongly believed that the Lab and its offspring, the Science and Technology

---

3. NASA Headquarters, "NASA Strategic Plan," February 1996, pp. 6, 10, 14–15, 18; Greg Carter, interview by Mack Herring, 10 July 1996, notes in SSCHRC; David Brannon, interview by Mack Herring and Ms. Myron Webb, 6 May 1996; Richard Miller, interview by Mack Herring and Ms. Myron Webb, 6 May 1996, tapes and notes in SSCHRC; "Harry Guin Receives New Appointment," *Lagniappe*, 21 August 1986, SSCHRC; A.J. "Jack" Rogers, Jr., interview by Dr. Charles Bolton and Steve Patterson, vol. 386, Mississippi Oral History Program, University of Southern Mississippi, SSC, MS, 1991, pp. 1–7, SSCHRC; Harry Guin, interview by Steven Patterson, vol. 430, Mississippi Oral History Program, University of Southern Mississippi, SSC, MS, 1992, SSCHRC.
4. NASA-SSC Organization Chart, July 1996.
5. Carter, interview; Miller, interview; Brannon, interview by Herring and Webb.

Laboratory (STL), were "too confining and obsolete" in the new world of personal computers (PCs) with "gigabyte capabilities." Dr. Carter mused that the ERL's old mainframe computer tied the scientists and researchers down with its "closed-room technology." "We can now accomplish at our own desks on a PC what we could with the old mainframe computer," he pointed out.[6]

Estess and Deputy Director Mark Craig looked upon the science function as one of the "three lines of business," along with commercial remote sensing and propulsion testing. This type of diversification, and Estess's pledge to continue his strong support of the resident agency concept, opened the doors to even greater diversification and expanding opportunities for the young scientists and engineers who came to the SSC in the late 1980s and early 1990s looking for future careers in science and engineering.[7]

Charles "Chuck" Hill, a Mississippi State University graduate from New Albany, Mississippi, was proud of the national accomplishments made by his commercial remote sensing group and pleased with its new organizational status. Hill joined the ERL staff in 1978 and believed that the customer-oriented experience the ERL employees learned in the early years was extremely helpful in their successful endeavors to form partnerships with private enterprise entities who sought help in solving their business problems. "We have a reputation throughout NASA that we can deliver more for the dollar than any other element in NASA," Hill proudly proclaimed. Estess, on the other hand, did not claim any credit for the phenomenal success of the Commercial Remote Sensing Program. "I just put Brannon and his guys in that office and allowed them to do the job," Estess said. The key word, in the Estess management philosophy, in practically every instance, is found in the word "*allowed.*" Estess became known by the SSC team as a delegator and enabler who allowed people to independently perform their own missions.[8]

Sharing some of the nostalgic feeling about the old ERL, Hill also quickly pointed out that the Lab served an extraordinarily useful purpose as a "facilitator in developing an international industry using remote sensing as a tool." Hill wisely observed, however, that in today's atmosphere of advanced technology, "You have to learn when its time to let go and move ahead with the

6. Carter, interview.
7. Miller, interview; Mark Craig, interview by Mack Herring, SSC, MS, 12 June 1996.
8. Charles "Chuck," Hill, interview by Mack Herring, 11 July 1996.

changing times." Hill pointed out that SSC Director Roy Estess was a "practical man" who encouraged the advancement of their "requirements-directed" commercial programs.[9]

The positive outlook and enthusiasm of the 1996 SSC team did not take place overnight. Estess and his colleagues made the development of a highly motivated and well-trained workforce a centerpiece in all of their planning efforts for over six years. As the old guard began to show signs of changing career plans and looking forward to retirement, Estess and his staff began recruiting replacements for the men and women who participated in the SSC's many major accomplishments during its 30-year history. There was no time, however, for an "orderly" transition" of the center's top management.[10]

In a short period of time, about three years, Estess lost several of his most experienced and reliable managers. Deputy Director Gerald Smith; Center Operations Director A.J. "Jack" Rogers, Jr.; Associate Director Bill Taylor; Personnel Director Sharon Jeffers; and Information and Management Systems Director (Science and Technology Laboratory) William "Bill" Huseonica all retired from NASA during the early part of the 1990s. Sadly, Propulsion Test Operations Director Harry Guin, a strong leader, visionary, and driving motivator for the SSC, lost his life in an automobile accident.[11]

To compound Estess's management problems, a sturdy supporting cast of SSC veterans, including Marv Carpenter and Wayne Roberts, also retired. Senior Marshall Space Flight Center (MSFC) and contractor managers at the SSC—Doug Howard, Bob Bush, Harry Johnstone, Roscoe Nicholson, and Tom Baggette—also left the SSC team for retirement. When Estess looked toward NASA Headquarters, he saw his boss and friend, Admiral Richard Truly, and long-time supporter, J.R. Thompson, leave their NASA Headquarters's positions for other opportunities.[12]

Straight ahead, Estess faced a full agenda with such important items as the developing lead center for propulsion testing, the shaping of a new vision for

---

9. *Ibid.*

10. Estess, interview; Gerald Smith, interview by Mack Herring, 5 July 1996.

11. See *Lagniappe* collection for retirements, transfers, and appointments of NASA senior staff, 1990–1996. See also NASA-SSC personnel records for like information; Biographies, Gerald Smith, Harry Guin; A.J. "Jack" Rogers, Jr.; William "Bill" Huseonica; William "Bill" Taylor; Sharon Jeffers; and Mack Herring, all located in SSCHRC. Their combined experience and tenure of service with NASA equates to over 100 years. The personnel moves of the SSC senior staff did indeed leave Director Estess with an important recruiting job.

12. *Ibid.*

Commercial Programs and Earth sciences, and technology transfer activities. These tasks, such as consolidation of management for all Agency propulsion testing at the SSC, involved coordination and organization at the national level with difficult decisions and far-flung organizational complexities.[13]

Such program initiations would be difficult under the best of circumstances, but during the "hard times" of the increasing fiscally conscious 1990s, a much heavier management burden was heaped on the SSC team, along with the new programs. Estess had to manage the SSC under close fiscal scrutiny, constantly trying to get the most "bang for the buck." Many avenues open to past center directors were not options for Estess during his watch.[14]

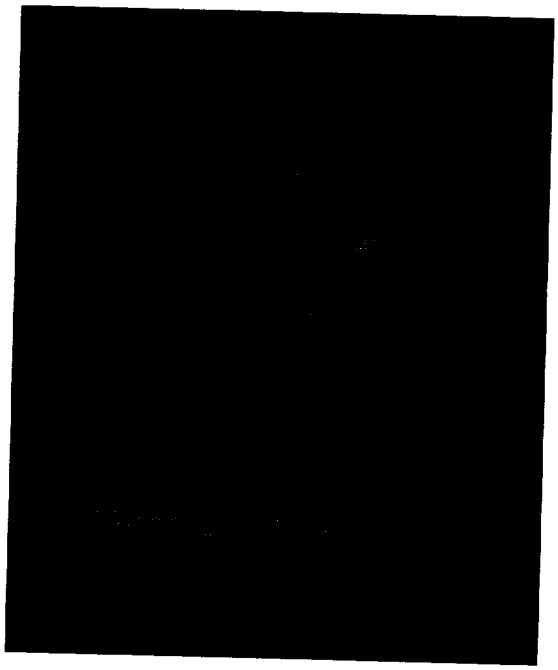
Although Jackson Balch had difficult battles to fight within the bureaucracy, he had a sense of financial security. Jerry Hlass, too, had to prove the installation capabilities and expertise in order to move into NASA's inner circles, but a good part of his tenure was during the liberal budget years of the Reagan and Bush Administrations, both favored NASA growth. Estess, on the other hand, was appointed just in time to be the recipient of budget deficits, downsizing of government, and a "challenged" NASA budget. Although he was assigned heavier management burdens, Estess was, at the same time, faced with getting the new jobs done at the lowest possible cost, a situation that was somewhat unfamiliar to NASA managers who grew up during the abundant budget days of the Apollo program. His fellow center directors at the larger centers usually operated with huge coffers of management and Research & Development (R&D) funds.[15]

Estess described the road for the team during the early 1990s as a "bumpy one." But, at the same time, he was optimistic about new rocket programs on the horizon; and he was pleased with the marketing effort SSC had done in

---

13. Estess, interview by Herring and Webb.
14. D.K. "Doug," McLaughlin, interview by Mack Herring and Ms. Myron Webb, 12 March 1996; Estess, interview by Herring and Webb.
15. Roger D. Launius, *NASA: A History Of The U.S. Civil Space Program* (Malabar, FL: Kreiger Publishing Company, 1994), pp. 131–132; John M. Logsdon *et al.*, eds., *Exploring The Unknown, Selected Documents In The U.S. Civil Space Program, Vol. I: Organizing The Exploration* (Washington, DC: NASA SP-4407, 1995); James E. Webb to The Honorable Everett Dirkson, 1 August 1966, Document 111–18, pp. 490–492, NASA Historical Reference Collection, History Office, NASA Headquarters; James R. Hansen, *Spaceflight Revolution* (Washington, DC: NASA SP-4308, 1995), pp. 427–430; Estess, interview by Herring and Webb, 24 April 1996; Lon Miller and Mike Dawson, interview by Mack Herring and Ms. Myron Webb, 6 May 1996, tapes and notes in SSCHRC.

expanding its capability to the commercial launch industry. A large part of the new NASA trend toward conservative fiscal management policies that Director Estess inherited, however, had to be delegated to a new, but eager, SSC management team.[16]



NASA Administrator Daniel Goldin prepares to speak during summer commencement exercises 3 August 1996 at the University of Mississippi in Oxford. Goldin challenged the graduates to "Burn [their] fingers by reaching for the fire inside [their] dreams." He dared the students to use the "fire inside" to "light up the world." (Photo courtesy of Robert Jordan, University of Mississippi [SSC-97-033])

Estess was not alone in believing his new SSC management team was up to the task of taking the Stennis Space Center into the twenty-first century. NASA Administrator Daniel Goldin expressed his delight with the enthusiasm of the young engineers and their supporting cast when he paid his first visit to the installation on 14 April 1992. Those at a private meeting with the senior staff in the Gainesville Conference Room remembered how intently Goldin listened as Harry Guin passionately emphasized the need to consolidate NASA's test activities at the SSC. Deputy Director Gerald Smith said there was no doubt that Goldin connected that day at Stennis with hopeful and zealous SSC personnel. The uninhibited, youthful SSC engineers openly discussed their ideas with the NASA chief, and he admittedly "listened" to their

16. Estess, interview by Herring and Webb; Monti, *Coast Magazine*.

opinions of his plans for the Agency. There is no doubt that Goldin's first impressions of the SSC team were somewhat enriched by Roy Estess, who was serving at the time as an assistant to the new Administrator at NASA Headquarters and made the airplane trip to the SSC with Goldin. Later, Goldin bragged at a Technology Fair in the State of Washington that the SSC work in commercial remote sensing was a national model for all to follow.[17]

When considering the good relations that developed between Daniel Goldin and the relatively fresh and ardent SSC team of engineers and scientists, it is no wonder that SSC Director Estess pointed with pride to the new and diverse SSC management team that was in place by the summer of 1996. Obviously, Estess was happy to see his NASA boss pleased with his SSC team members and their accomplishments, which they proudly displayed to the new Administrator. That special relationship between Goldin and the SSC team continued, and the NASA Administrator told Estess after a tour of the SSC Test Complex in 1995, "This is a good place; don't screw it up!"[18]

The Stennis People

"The good place" Goldin spoke of had a workforce directed by a culturally diverse management team assembled by Estess to tackle new challenges facing the SSC. The SSC team's personnel recruiting efforts resulted in six of the 13 organizational elements at the center being headed by women and members of various minorities. There were a few seasoned NASA managers among the group, but several members of the "new" SSC team were already respected leaders from other NASA centers and programs who had joined the SSC team.[19]

In his high-intensity recruiting program, Estess was able to bring Boyce Mix, one of the most experienced propulsion experts in the country, into the SSC organization in 1994 as director of the growing and critical Propulsion

17. "Goldin Makes First Visit To SSC," *Lagniappe*, 20 April 1996, SSCHRC; Charles "Chuck" Hill, interview by Mack Herring, SSC, MS, 11 June 1996.
18. Estess, interview by Herring and Webb.
19. NASA-SSC Organization Chart, July 1996, SSCHRC; Estess, interview by Herring and Webb; Craig, interview; Pamela G. "Pam" Covington, interview by Mack Herring, SSC, MS, 12 July 1996; NASA-SSC Biographies, Mark Craig, Lon Miller, David Brannon, Pam Covington, Boyce Mix, Myron Webb, Richard Arbuthnot, Marina Love, Florence Kailiwa-Barnette; John Gasery, Kirk Sharp, and Kim Graham Stone.

Test Directorate. Mix, who began his aerospace career at SSC in the 1960s as deputy chief of the S-1C booster test program, had for years directed the Space Shuttle Main Engine (SSME) testing at the SSC for NASA-MSFC. Estess lured Mix back to the SSC from his position as MSFC director of the SSME project office.[20]

John L. Gasery, Jr., who had directed the SSC's Safety and Mission Assurance Office, added his expertise to the support of the new lead Center of Excellence portfolio of experienced personnel. No doubt, Gasery's attention to the center's safety and quality programs was a major factor in the SSC's credibility in rocket testing. David Brannon and Rick Miller were elevated in the new SSC organizational structure with their Commercial Remote Sensing and Earth Systems Science program offices, respectively, answering to Estess. Lon Miller, with an extensive background in propulsion technology planning and Agencywide recognition as an extremely competent manager, was added to the Propulsion Directorate.[21]

Marina Love, budget expert and comptroller, brought her respected credentials to bear as the SSC's Chief Financial Officer. Love came to the SSC with experience from both the Kennedy Space Center (KSC) and NASA Headquarters. Ken Human, who appropriately advised Estess through numerous touchy legal issues, including the Advanced Solid Rocket Motor (ASRM) and buffer zone conflicts, added his strength as Chief Counsel to the new management team. Ms. Myron Webb, who assisted Estess in his handling of public affairs, continued advising the SSC director in public and community relations. David Powe, who brought national credit and recognition to the installation with the Tri-State Education Initiative, extended the institution's educational aims in his work with state and NASA Headquarters officials.[22]

Florence Kailiwai-Barnett, decorated manager and former associate director of NASA's Dryden Flight Research Center, was named by Estess as director of the Center Operations and Support Directorate. With this appointment, she replaced A.J. "Jack" Rogers, Jr., and brought "other center" experiences to the SSC, as well as a reputation as an Air Force "Manager of the Year." Another newcomer to the SSC organization was Kim Graham Stone, appointed by

---

20. *Ibid.*
21. See NASA-SSC biographies of senior staff, SSCHRC.
22. *Ibid.*

Estess to head the Procurement Office. Prior to joining the Stennis team, Stone was a deputy director of the Acquisition Division at NASA Headquarters. Kirk Sharp, a reliable SSC administrator, brought management experience from his tenure as deputy chief of the former Information and Management Systems Office to become the SSC's first Chief Information Officer to the newly created and recognized Technology Transfer Office. This area was elevated by Estess, who had long-championed technology transfer activities at the SSC.[23]

Estess was also fortunate to recruit Richard E. "Rick" Arbuthnot as chief of the Human Resources Office. Arbuthnot came to the SSC from NASA Headquarters where he was administrative assistant to the Associate Administrator for Human Resources. Encouraged by the gains the SSC had made in its propulsion test mission, Arbuthnot felt that the 210 NASA civil service and 3,598 government and contractor personnel working at Stennis had a bright future ahead. Arbuthnot said he was impressed with Estess and his integrity as a manager. "I am honored to work for a man like Roy Estess," Arbuthnot said.[24]

Jon B. Roth, who has served as assistant to the director and as Procurement Officer at the SSC since 1988, is a retired Navy Commander with experience in private business—as a manager and as a public accountant. Roth's naval experience and his gentlemanly manners helps in his role as a representative to the resident agencies. Estess depends on Roth to assist in a wide range of activities that involves interagency cooperation.[25]

Estess appointed Pamela G. "Pam" Covington in 1992 to serve as the SSC Equal Opportunity Officer. Covington, a native Mississippian from Jackson, had experience as an intern in several elements of the organization including Procurement, Public Affairs, Personnel, and in the STL. She helped Estess achieve "good marks" in recruiting women and minorities. Most employees at the SSC feel comfortable discussing their problems with Covington. Estess said he was pleased with the SSC's work in getting women into the workforce and vowed to continue recruiting them.[26]

Although Estess refused to play favorites with members of his staff, his selection of deputy was one of his best personnel decisions. When Gerald

---

23. *Ibid.*
24. Richard Arbuthnot, interview by Mack Herring, 12 July 1996.
25. Jon B. Roth, interview by Mack Herring and Ms. Myron Webb, SSC, MS, 6 May 1996.
26. Covington, interview; Estess, interview by Herring and Webb.

Smith retired, Estess lost a very competent manager and respected propulsion engineer. Estess named Mark Craig, who was architect of the NASA Strategic Plan and the strategy for NASA's Human Exploration and Development of Space (HEDS) Enterprise, as his deputy. Estess worked with Craig while serving as assistant to Goldin at NASA Headquarters. The two men worked together on one of Goldin's action teams when the new Administrator was restructuring the Agency to meet budget guidelines and set NASA on a more efficient and productive course. Estess and Craig became agents of Goldin's "faster, better, cheaper" doctrine and were responsible for such changes as the reshaping of the Space Station program.[27]

When Craig reported to SSC in 1995, he brought with him vast experience in managing major NASA programs and in long-range planning at Johnson Space Center (JSC) and at NASA Headquarters. In addition to heading the Space Exploration Directorate at NASA Headquarters, Craig also served on the Administrator's staff, helping Goldin in his early days of transition at NASA Headquarters. Along with a great deal of enthusiasm, Craig added a "new language" to planning discussions and exercises at the SSC. The leader also contributed a high level of sophistication in management strategy and planning to which most Stennis employees had not been exposed. For instance, Craig saw the SSC as being involved in three "lines of business" which included commercial remote sensing, Earth systems science, and rocket propulsion testing. To the delight of some and the consternation of others, Craig did not necessarily list the three in the same order as other members of the senior staff. Perhaps the good-natured and sly deputy director listed his "lines of business" in a contrary order to provoke spirited discussion. For those not familiar with the SSC jargon, Craig usually listed "propulsion" last, behind commercial programs and science activities.[28]

Estess's management philosophy, which supported the Agency's approach to affirmative action, was to put a person in a job and "give them space" to manage their own area of the SSC operations. Perhaps Estess paid close attention to one of his mentors, Jackson Balch, who said he believed in putting his people in a position "where they could fail." Balch said time and

---

27. Craig, biography, SSCHRC; Commentary, "Notes Of A Newcomer," *Lagniappe*, 25 May 1995, SSCHRC; "NASA Strategic Plan," *Lagniappe*, 20 July 1995, SSCHRC; Craig, interview.
28. *Ibid.*; Estess, interview.

again, "A job that gives a person the chance to fail—and fail hard—is a good job. If a person has a 'fail-safe job,' it's not worth a flip!" Apparently, Roy Estess's own straightforward management concept paid off during his first years, because every manager in his organization respects and speaks well of their relationship with the SSC director. When compared to Fortune, Balch, and Hlass, who served before Estess, one senior staffer said Estess was not like any of his predecessors, but developed his own management style as the SSC's fourth director/manager.[29]

In Remembrance Of Fallen Friends

History has a way of claiming our best leaders before they live to see their life's work reach full fruition. Abraham Lincoln, Woodrow Wilson, Franklin Roosevelt, and John Kennedy are just a few such examples. In the case of the SSC, there were four men, Henry Auter, James Fletcher, Harry Guin, and John C. Stennis, who died during the 1990s before the SSC reached its loftiest goals. Wernher von Braun and Jackson Balch were claimed by death by 1980. Although these men played huge parts in the center's history, it is safe to state that they would have been absolutely delighted to see the astonishing developments that came about at the SSC. No one would dispute that all of these fallen leaders would have been ecstatic to see the SSC proclaimed as NASA's Center of Excellence for Rocket Propulsion Testing with a lead-center purview that reached across Agency and geographical borders.[30]

But alas, Henry Auter, who served as the installation's first deputy director and its only "acting director," died on 11 February 1991 of a heart attack

---

29. E.W. "Van" King, interview; Jackson Balch described his own "personnel management philosophy" to the author during several discussions in May 1969 after the author disclosed that he was going to transfer to NASA Headquarters in Washington, DC. Balch said there was so much bureaucracy at Headquarters that a "fail-safe" workplace had been created, whereby "no one was to blame" when something went wrong. On the other hand, he said he believed that a person should be allowed to "fail and fail hard" if he or she had a good job. Perhaps he never forgot his failure with a house-paint business in Huntsville. Balch felt that he gave employees an opportunity to "fail" on their own. Indeed, he often gave assignments to his staff in which they were entirely on their own where the results were not traceable back to Balch. In many ways, Roy Estess seemed to have adopted Balch's philosophy. Estess, however, was far less threatening in his approach and seemed to put his employees "at ease." Estess enjoyed recounting actual stories to his employees, somewhat like a Southern "front porch philosopher."
30. Mix, interview; Rogers, interview.

at his home. Many employees had referred to Mr. Auter as the SSC's "godfather," because he gave so much of his time helping others advance in the NASA organization and in projects assisting those less fortunate in his community. His last task was completing his duties as treasurer of the Picayune First Presbyterian Church.[31]

Dr. James C. Fletcher, two-time Administrator of NASA who became closely associated with the SSC during the early 1970s, worked at the national level to raise the center's status from a purely rocket test facility to a space and environmental, multiagency research complex. In fact, Dr. Fletcher issued an Administrator's decision in 1974 that "officially" renamed the Mississippi Test Facility (MTF) to the "National Space Technology Laboratories" (NSTL), and raised its status as a separate facility answering directly to NASA Headquarters and not reporting to the MSFC in Huntsville. Fletcher was also helpful in getting the center renamed after Senator John C. Stennis in 1988. Fletcher, who last visited the SSC in the spring of 1989, died of lung cancer at his home in suburban Washington on 22 December 1991.[32]

Perhaps the saddest surprise came to the SSC team on 15 October 1993, when Harry Guin was cut down in his prime in a fatal automobile accident while he was enroute to witness his beloved "Crimson Tide" Alabama football team in action. Mr. Guin was one of the SSC pioneers, having started work at the site in the summer of 1963. He became known as a "visionary," promoting the SSC as the nation's Center of Excellence for Rocket Propulsion Testing. Like his role model, University of Alabama Coach Paul

---

31. Henry Fenimore Auter, Jr., Obituary, *The (Biloxi/Gulfport, MS) Sun Herald*, 12 February 1991; Mr. Auter loved the space program and devoted most of his career to NASA's work at the MTF and the NSTL. He helped design structures at the test facility and was in charge of testing the Saturn V boosters during Project Apollo. Curious, however, Mr. Auter wrote that the development of the multiagency complex at the MTF was the most significant historical event at the site. He was working as a consultant with the author helping develop the historical archives for the SSC when he died. The author talked to Mr. Auter about future historical archives just two days before he died.

32. NASA Headquarters, "James C. Fletcher Biography," SSCHRC; Roger D. Launius, "A Western Mormon In Washington, DC: James C. Fletcher, NASA, and the Final Frontier," *Pacific Historical Review*, (May 1995): pp. 217–41: Fate brought Dr. Fletcher in close contact with the SSC history on two significant occasions. Dr. Fletcher was the NASA Administrator who executed the document that created the NSTL on 14 June 1974. He flew to the Stennis International Airport in Hancock County, MS, and made an announcement to the local media proclaiming the new installation. When Dr. Fletcher returned to the south Mississippi facility as Administrator on 12 May 1986, he was a supporter of the development of the SSC and was instrumental in its renaming and designation as the John C. Stennis Space Center on 20 May 1988. He also appointed Jerry Hlass as manager of the NSTL in 1976 and Roy Estess as director in 1988.

"Bear" Bryant, Mr. Guin was a respected leader of people and a compassionate individual who evoked "the very best" of team members who served in his ranks. He was one of the authors of the "White Paper" presented to the Crippen Group in New Orleans in 1986 and a champion of the center's quest to become the lead center for propulsion testing. Reference papers left on Guin's desk the afternoon he died are evidence that he could see his "vision" for the center nearing its fruition.[33]

During his last visit to south Mississippi and the NASA SSC on 23 August 1990, Stennis insisted that he visit the site at old Logtown, where the long and fascinating odyssey of the Stennis Space Center began. Roy Estess was joined by Roy Baxter, Jr., Mack Herring, Myron Webb, and a few other friends on the journey back in time.[34]

The open ball field, on the Logtown School grounds where the meeting was held in 1961, was covered by towering pine trees and undergrowth. The Stennis party pointed to the spot where the flatbed truck that Stennis spoke from 30 years earlier was parked. On that return to Logtown in August 1990, the thoughtful Senator smiled and seemed pleased when he was told by Baxter, Estess, and other friends in the party that "it all worked out for the best." Senator John C. Stennis, father of the Stennis Space Center, died 23 April 1995 at the age of 93.[35]

---

33. Mack Herring, Commentary, "He Was Number One," *Lagniappe*, 19 November 1993, SSCHRC; Mr. Harry Guin was a personal friend of the author. We first met on the first day Guin reported for work at the MTF in 1963. We worked on several joint projects together, the most memorable being the dedication of Stennis Space Center during the late spring and early summer of 1989, prior to the 3 August 1988 dedication. After studying the letters, documents, plans, and interviews that were part of this book, the author came to the inescapable conclusion that Mr. Guin was a true visionary and so dedicated to the SSC that he fought "against all odds" to see the SSC reach its full potential. His legacy will go on as long as the Stennis Space Center exists.

34. Pat Towell, "John Stennis, Longtime Symbol Of Senatorial Rectitude," Obituary, *Inside Congress*, Washington, DC, 29 April 1995; U.S. Senator John C. Stennis dominates the history of the SSC. He was a staunch supporter of America's space program until the day he retired from the Senate in January 1989. Dr. Fletcher remarked the day of the dedication, that the center should have been named for Stennis "a long time ago." Fletcher depended on Stennis, somewhat like eight U.S. Presidents who served "with" the Senator, to lead the Agency's budgetary battles in the Congress. The respected Senator no doubt played an important role in the location of the center in Mississippi, but it must be pointed out that he would not have supported the effort if he believed there was a better location elsewhere in the country to test America's rockets. Senator Stennis's belief in the people of his state and their ability to participate in "greatness" as supporters and workers at the space center, undoubtedly was also a major factor in his tenacious support of the SSC.

35 *Ibid.*

The Stennis Vision

When Senator Stennis died, Roy Estess observed, "He was a giant in every way." With Stennis, there were Guin, Fletcher, and Auter who walked the pages of the Stennis Space Center history book. They helped lay a foundation and set the center on a course toward full realization of a "bigger dream." The SSC vision began to sharpen in the mid-1990s, featuring a focus on old ambitions with new approaches to excellence in rocket propulsion testing to serve the nation's test needs.[36]

The new SSC vision was also inclusive with other lines of business to pursue, exploiting the SSC expertise in Commercial Remote Sensing and enhancing its Earth Science research. When the Clinton Administration initiated its "reinventing government" policies in 1993, Stennis employees exclaimed, "Why, we've been reinventing government for 25 years!" They were right, too, because the multiagency complex had featured the sharing of research and resources since the early 1970s. Now, Roy Estess and his management team had incorporated the multiagency doctrine in their new vision for the twenty-first century.[37]

Administrator Daniel Goldin also found the SSC especially appealing with its small, but innovative team making use of diverse talents to accomplish new missions, "better, faster, and cheaper." Since the SSC crew had managed with less funding than most NASA installations for years, managing the Stennis Center in the tight fiscal times of the 1990s was not an insurmountable handicap.[38]

For instance, from FY93 to FY96, the facility operations budget was reduced by 20 percent, and contractor staffing was lowered by 17 percent. These remarkable savings were made possible by closing facilities, consolidating functions, and reviewing operations to find more efficient ways of doing business. In addition to these savings, from FY93 to FY95, the shared operating costs by NASA and the resident agencies were reduced by $2.7 million. Two examples that contributed to cost savings at the SSC were the Main

---

36. "U.S. Senator John C. Stennis..." *Lagniappe*, 25 May 1995, SSCHRC; Estess, interview by Herring and Webb, 7 July 1996.

37. Management Presentation, "The Stennis Space Center," cover sheet, boxed motto, "Reinventing Government For 25 Years," 14 September 1995.

38. "Stennis Space Center Budget History By Major Programs," 23 October 1995; Estess, interview by Herring and Webb, 7 July 1995.

Electrical Substation privatization project in 1993 with Mississippi Power Company and the NASA-Navy library consolidation of 1995.[39]

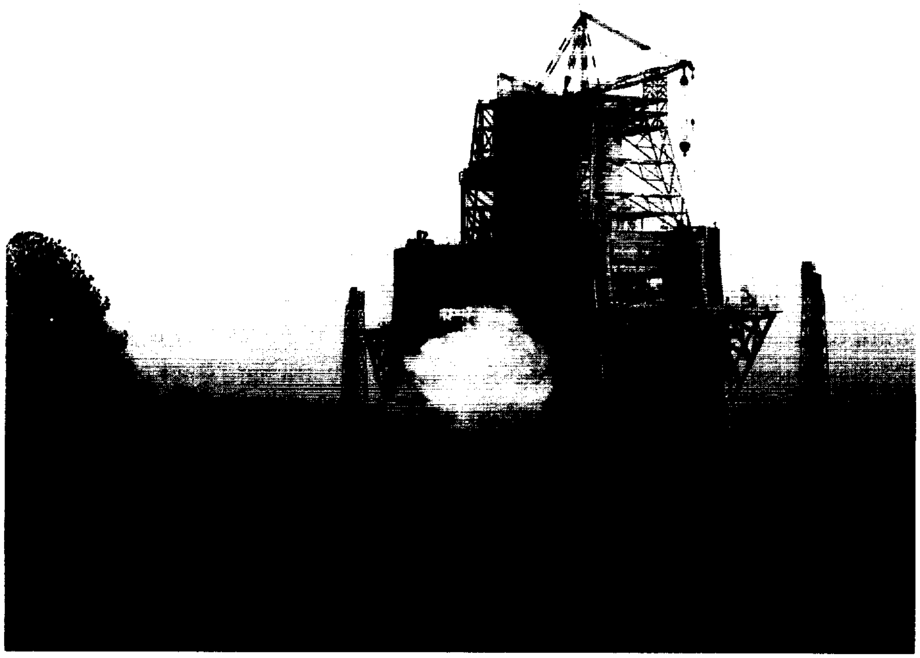
Estess mused that many "highly technical and accomplished" NASA managers had not had to deal with "survival" in the same manner as their colleagues at the SSC who had struggled for years to make ends meet. He pointed out that a number of NASA programs at other centers and locations "just rolled in" with the managers not having to "scrap and fight" for work to obtain the programs as did the small NASA crew at the SSC.[40]

Nevertheless, along with the budget considerations there was still much work to be accomplished by the SSC team of the 1990s as it reached to raise the center to a higher level in the NASA hierarchy. Richard Bach, aviator and author, wrote, "You are never given a wish without also being given the power to make it true. You may have to work for it, however." Roy Estess and the SSC team had realized Bach's axiom many years ago and had worked more days than not trying to get their bosses up the line to pay attention to their plans for the center.[41]

An important milestone that focused on the SSC's emerging role as a propulsion center of excellence came in 1992 when Estess and T.J. "Jack" Lee, MSFC director, signed a joint statement of agreement between their centers regarding the development and test of propulsion components and systems. More importantly, the document acknowledged the development of the SSC into a "Center of Excellence for Rocket Propulsion Testing." Goldin had insisted that Estess and Lee meet and settle this issue. After they signed the document, it was immediately forwarded to Goldin in Washington under a jointly signed cover letter. The agreement included most issues between the MSFC and the SSC, but the "test management" role for the Space Shuttle Main Engine (SSME) program was not covered. Both parties agreed that the contested issue, the "responsibility for SSME testing," would be addressed at a future date.[42]

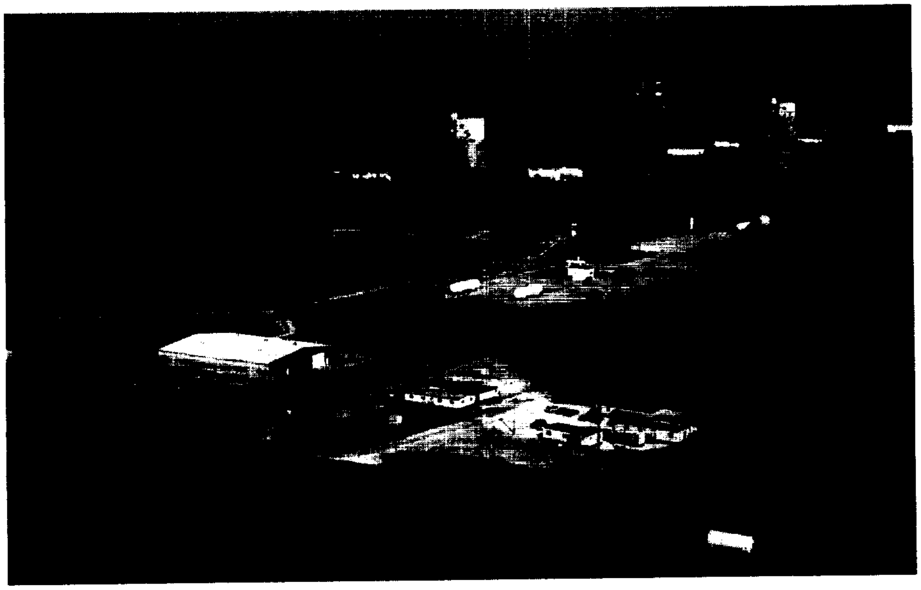
---

39. McLauglin, interview by Herring and Webb; Doug McLaughlin, "SSC Budgetary Savings," paper especially prepared for SSC History Office by Doug McLaughlin, July 1996, copy in SSCHRC.
40. Estess, interview by Herring and Webb, 24 April 1996; Estess, interview by Herring and Webb, 7 July 1996; McLaughlin, interview by Herring and Webb.
41. Estess, interview by Herring and Webb, 24 April 1966; Richard Bach, *Illusions: The Adventures Of A Reluctant Messiah* (New York: Delacorte Press/Eleanor Friede, 1978), p. 92.
42. Estess, interview by Herring and Webb, 7 July 1995; Roy S. Estess and T.J. Lee, III, Daniel S. Goldin, cover letter for agreement, 29 June 1992; Roy S. Estess and T.J. Lee, III, 20 June 1992.



NASA's John C. Stennis Space Center in Hancock County, MS, flight certifies all of the main engines that help power the Space Shuttle into Earth's orbit. Shown on the "B" stand, B-1 test position, is a static firing of a Space Shuttle Main Engine. One of the many tame deer, which share the SSC environment, studies a "common place" test-firing. (SSC-96-129-15)

Agency and public recognition of the SSC's Center Of Excellence status came when the Agency began to define its vision in 1991-1992. Ken Human was named by Estess to coordinate the SSC inputs for the NASA Agencywide Vision Statement. Human remembered how eager the SSC employees were to participate in the NASA-wide project. The Vision Statement was published in 1992 and entitled, "John C. Stennis Space Center Long-Range Plan for the 1990s." It was printed on page one of the 15 June 1992 *Lagniappe*. The statement read, "To expand the frontiers of space exploration, Stennis Space Center will provide the United States with the world's best center of excellence for ground-testing large space propulsion systems. This center is represented by a unique pool of talent and state-of-the-art test facilities and technologies. Stennis Space Center delivers safe, responsive, and cost-effective propulsion test services which



This 1992 aerial view shows Stennis Space Center's propulsion test facilities. The four large test stands are the E-1 Test Facility (center); A-1 Test Stand (left); A-2 Test Stand (right); and B-1 Test Stand (far back). (SSC-92-039-37)

sustain U.S. leadership in space exploration and enhance our economic competitiveness."[43]

The Stennis vision was brought into sharper focus on 1 May 1994 when the responsibility for SSME test management was transferred from the MSFC to the SSC. The transfer marked the first time in the entire history of the center, even during the time of the Apollo program, that the SSC would be in charge of rocket testing at the installation. True, the former MTF organization had a great deal of autonomy during the certification testing of the Saturn V first- and second-stage rockets in the 1960s and in 1970, even as a component installation of the MSFC. The MSFC, however, was ultimately in charge of managing the test program.[44]

The SSC's goal of assuming the responsibility for test management had been sought after by SSC managers for at least two decades. The illusive prize

43. Ken Human et al., "SSC Vision Statement," *Lagniappe*, 15 June 1992, SSCHRC.
44. "SSME Testing Transferred From MSFC to SSC," 18 May 1994; Estess, interview by Herring and Webb, 7 July 1995; Boyce Mix, interview by Mack Herring, SSC, MS, 27 June 1996.

came about shortly after G.P. "Porter" Bridwell, an old friend of Estess and others at the SSC, was named director of the MSFC on 6 January 1994. Bridwell had served as acting deputy director of the SSC in the spring of 1987, while Estess was temporarily away engaged in the Advanced Management Program at the Harvard Graduate Business School. During that time, Bridwell developed a greater appreciation for the expertise of the SSC and reacquainted himself with the installation's extensive test facilities. In addition, Bridwell was exposed to a liberal dose of "brainwashing" by Harry Guin and other supporters of a major role for the SSC in rocket propulsion testing.[45]

When Bridwell assumed the director's position at the MSFC, he told Estess, "Hey, I read the mail. Two administrators [Truly and Goldin] have decided that Stennis ought to be the Center of Excellence for Rocket Propulsion testing, and the only outstanding issue is the SSME; therefore, I'm moving the SSME to Stennis. I'll make that decision!"[46]

Bridwell had the "pleasure" of informing his SSC friends and colleagues of the SSME transfer at a Stennis Center Awards Ceremony on 5 May 1994, at which he was the featured speaker. "We're a sister center, and we're going to work together. I pledge our support to you," Bridwell stated. He also said that he wanted the MSFC to work more closely with Stennis on NASA research technology projects for "future propulsion systems testing." Harry Guin, a staunch advocate of the advancement of propulsion testing, was posthumously awarded the NASA Outstanding Leadership Medal at the ceremony where Bridwell announced the test management transfer.[47]

A memorandum of agreement between the MSFC and the SSC making the historic test management transfer pact official was signed by Estess on 28 June 1994 and Bridwell on 21 July 1994. Deputy Associate Administrator for Space Flight (Space Shuttle) Bryan O'Connor concurred in the document that was designed to produce more efficient and cost-effective propulsion operations for the Agency.[48]

Boyce Mix, who had managed the test program for the MSFC for years, observed in a recollection in June 1996, "The transfer of the SSME test man-

45. Jerry Hlass to Staff, memorandum, "Appointment Of Acting Deputy Director," 23 March 1987; NASA Headquarters, "Center Directors Biographies," SSCHRC.

46. Estess, interview by Herring and Webb, 24 April 1996; Mix, interview.

47. *Ibid.*

48. Roy S. Estess and Porter Bridwell, "Memorandum Of Agreement," 2 August 1994.

agement mission was the right thing to do. Porter called me in while I was still working for the MSFC and said he intended to transfer the SSME test management role to the SSC and asked my opinion. I told Porter that the SSC would do a good job managing the SSME test program." Mix said Bridwell then replied, "I'm going to do it!" The seasoned Mix further observed that the test management mission, in a like manner to the completion of the Component Test Facility (CTF), was an acquisition that was absolutely necessary before the SSC could be seriously considered as the Agency's lead center for rocket testing. Test management, then, was one of several pieces of a "puzzle" Estess had to put together before his vision for the SSC was totally clear.[49]

As Mix surmised, the test management mission was an enormous milestone for the SSC in securing credibility as the Agency's lead center for rocket testing. In addition, at least three major studies conducted by NASA and the government in 1994 and 1995 underscored the SSC's contention that the nation should institutionalize and consolidate its rocket test programs. The NASA Federal Laboratory Review (NFLR) and the NASA Zero-Base Review (ZBR) budget challenge initiated in 1995 pointed to the SSC as a Center of Excellence for Rocket Propulsion Testing and recommended that management of all rocket testing be consolidated at Stennis. A third study, called the National Facilities Study (NFS), conducted in 1994 was not quite as favorable for the SSC because it recommended certain turbopump testing be performed at the MSFC instead of the SSC. The NFS did, however, call for an end to duplication of NASA and DoD facilities nationwide, a point which was to the liking of the SSC management. The deck could have been partially stacked in favor of the SSC because the SSC deputy director was a member of the NFS team.[50]

SSC Director Estess was extremely pleased at the recognition and recommendations of these prestigious study teams. When Administrator Goldin

---

49. Mix, interview.

50. NASA Federal Laboratory Review Task Force, NASA Advisory Council, "NASA's Federal Laboratory Review," February 1995, SSCHRC. It is important to note that the "NASA Federal Laboratory Review" was prepared by the NASA Federal Laboratory Review Task Force under the auspices of the NASA Advisory Council (NAC). The results were then submitted 28 February 1995 to the Office of Science and Technology Policy (OSTP) at the White House. This review was part of the Interagency Federal Laboratory Review which included material from the Departments of Defense and Energy along with NASA. The review was undertaken by all concerned as a means to improve the efficiency and effectiveness of the federal government's R&D programs and investments.

released the findings of the ZBR on 19 May 1995, Estess said, "The overall impact of this announcement is very positive for the Stennis Space Center." Estess had a right to be pleased with the ZBR findings. The study recommended that the SSC assume management of the NASA White Sands Test Facility from the JSC and facilitate "all" future rocket engine testing for the Agency.[51]

A bonus for the SSC also came from the ZBR exercise. Estess and his rocket team coined a novel management strategy they called the "National Rocket Propulsion Test Alliance" (NRPTA) and presented it at a landmark ZBR meeting at the KSC on 31 March 1995. The NRPTA would be composed of representatives from the following civilian and DoD installations involved in rocket testing: SSC, White Sands Test Facility, Lewis Research Center, MSFC, Phillips Laboratory at Edwards AFB, Arnold Engineering Development Center, Naval Warfare Center, and Redstone Technical Test Center. The Test Alliance plan was designed as an advisory body with authority to develop major propulsion test policy and place systems at the most appropriate and economical facility for a particular result.[52]

Estess recalled that Lon Miller played a major leadership role in helping pull together the ZBR presentation that contained the Test Alliance plan. Proudly remembering the KSC meeting, Estess said the presenters at that important review were Lon Miller, David Brannon, Tom Sever, Robert Bruce, and Doug McLaughlin. Estess exclaimed, "That's a real team!" Apparently the ZBR group was equally impressed by the Stennis team. To the delight of the SSC managers, the Test Alliance plan presented by the SSC was so well received by the ZBR team that they incorporated the NRPTA in their final recommendations, and an action to implement the plan was passed on to SSC.[53]

Estess and his crusaders found that they were not in the game alone. From the very outset, Goldin clearly connected with the enthusiastic efforts of the SSC to emerge as a leader in his scheme to do things in NASA "faster, better, and cheaper." As Roy Estess recalled, "The moons were lined up," and he modestly added, "I didn't have a thing to do with it. Administrators changed,

---

51. NASA Headquarters, "NASA Zero Base Review And FY 1997 Process," Briefing To Congress, May 1995, SSC Director's Files, SSCHRC; Estess, interview by Herring and Webb, 24 April 1996 and 7 July 1995; Lon Miller, interview by Herring and Webb, 4 May 1996.

52. *Ibid.*; Estess, interview by Herring and Webb, 24 April 1996; Estess, interview by Herring and Webb, 7 July 1995; NASA-SSC, National Rocket Propulsion Test Alliance, "Shaping Test Capability To Match National Needs," Presentation, 28 July 1995), SSCHRC.

53. Estess, interview by Herring and Webb, 7 July 1995.

and when another Administrator came in [Goldin], he even made changes that have helped us substantially. He's pushed us ever further up the ladder. He's challenged us to go forward."[54]

There were other NASA Headquarters officials in the 1990s who favored the SSC progressive and supportive attitude. Major General Jeremiah W. "Jed" Pearson, III, USMC, was named in April 1992 to replace William B. "Bill" Lenoir as associate administrator for the Office of Space Flight. Although Lenoir had proved to be a good friend and supporter of the SSC's program, Pearson also quickly took a liking to Roy Estess and his team. In March 1992, John R. "Jack" Dailey was named by Goldin as Acting Deputy Administrator. Like Pearson, Dailey was a Marine, having risen to the lofty position of Assistant Commandant in August 1990. Perhaps both Headquarters leaders were impressed with the "gung ho" attitude of the Stennis team in its support of overall NASA-wide objectives, a quality not universally found in a proud NASA organization that had sometimes experienced conflict with its parochial attitudes.[55]

With the "stars aligned" in the heavens for the restless SSC group, the road still remained a bit "bumpy" on the more realistic roads on Earth. With the support of Goldin, Pearson, and Dailey at the Headquarters, and endorsements from the NASA Federal Laboratory Review, the National Facilities Study and the White House-favored ZBR, one might think that the SSC managers could finally rest easy with their missions secured as the center prepared for the twenty-first century. As the Congress began serious deliberations on the FY97 budget in the spring of 1996, however, Roy Estess and his senior staff worried that "something might go wrong." After all, a significant role for NASA's "Lead Center for Rocket Propulsion Testing" entailed consolidation of test functions and activities at other locations, such as the test laboratory at the SSC's old nemesis, the MSFC in Huntsville, Alabama. Test facilities at White Sands were also scheduled to be terminated by the new NASA test consolidation plan, with rocket propulsion testing at the MSFC and White Sands to be managed by Stennis Space Center.[56]

---

54. *Ibid.*

55. Sue Richard, NASA Headquarters News Release, "NASA Administrator Announces Headquarters Appointments," 28 April 1992, SSCHRC; Jeff Carr, NASA Headquarters News Release, "Organizational Changes To Enhance Programs, Relations," 11 March 1993, SSCHRC.

56. Estess, interview by Herring and Webb, 24 April 1996; "Russian Rocket Findings Will Capture Redstone's Engine Testing Program," *Huntsville (AL) Times*, 29 March 1996; Lon Miller and Mike Dawson, interview by Herring and Webb, SSC, MS, 4 May 1996.

As one might imagine, after 35 years of having management matters 180 degrees in the other direction, the consolidation plan was met with consternation, opposition, and a lot of "foot dragging" from management elements and politicians representing some of the other NASA centers involved. Although the scheme would save the federal government and the national taxpayers millions of dollars, the plan was met with sour-grape chides from the Alabama center, such as "we were born to test" and "testing is our tradition." These howls grew as Goldin prepared to present his Operating Plan to Congress and implement the NASA-wide findings of the ZBR, which included test consolidation at the SSC. Only one "star" had fallen out of alignment, the SSC's old friend Porter Bridwell, the MSFC director who was influential in transferring SSME testing to the SSC, had retired. He was replaced by Wayne Littles of the old-time, more "traditional" MSFC management team. The MSFC's loss of its dominance over the SSC no doubt was worsened when the SSC placed a resident office in Huntsville in March 1996.[57]

In late April 1996, Estess worried that the consolidation plan might still fail, even with all data points giving a green light to Administrator Goldin's NASA proposal. It was hard for anyone to imagine that the NASA Administrator and his very top people could not get their own way with the NASA organization. A last piece of the consolidation and lead center puzzle was the approval of approximately $45 million in funds for upgrading and completing the CTF. The request for CTF monies was included in Goldin's FY97 Operating Plan sent to Congress as part of the appropriations bill.[58]

Another fortuitous event occurred when the SSC's long-time supporter, Senator Trent Lott, was elected Senate Majority Leader to replace Republican Presidential candidate Robert "Bob" Dole. Lott had been one of the SSC's most ardent supporters throughout his highly successful political career. Senator Lott began working to promote the SSC in 1968, when he was administrative assistant to 5th District Congressman William "Bill" Colmer. Lott was elected to that House Seat in 1972 as a Republican when Colmer retired and served as a U.S. Representative until he was elected to the Senate in 1988. With his home at Pascagoula, Mississippi, on the Gulf Coast, Lott had been

---

57. Scheuermann, interview; Ms. Myron Webb, interview by Mack Herring, SSC, MS, 24 July 1996; Patrick Scheuermann, interview by Virginia A. Butler, SSC, MS, 11 February 1997.
58. Daniel S. Goldin to The Honorable Jerry Lewis, "FY96 Operating Plan," 4 June 1996.



U.S. Sen. Trent Lott of Mississippi (left) meets with Roy Estess, Stennis Space Center director, during an August 1996 visit. Lott, a staunch supporter of the Stennis Space Center, was chosen Senate Majority Leader by his colleagues in 1996. (SSC-96-448-4)

one of the architects of the multiagency concept and had supported all of the SSC agencies and their programs at every juncture. He stood vigil on Capitol Hill in the summer of 1996 as the NASA Appropriations Bill, with the consolidation plan and the over $45 million CTF-enhancement funding proposal, passed the House and Senate. A cautious Lott kept a keen eye on the NASA bill as it worked its way through final congressional committee actions.[59]

The Lead Center

Even while NASA legislation was being pondered on Capitol Hill, on 29 May 1996, Roy Estess assembled the SSC employees in the Visitors Center auditorium to hear possibly "the best news" in the installation's entire 35-year history. The occasion was the center's annual Honor Awards Ceremony, an event that had been traditionally a time of good cheer. NASA Administrators, astronauts, and national leaders, such as Stennis and Lott, had in the past come to the Visitors Center to pay tribute to the NASA-Stennis team. The auditorium had been the scene of some sad times, also. Most vowed never to forget the

59. Office of Senator Trent Lott, "Biography," July 1996.

crew of the *Challenger* in a memorial service, as the SSC employees joined their NASA colleagues in a nationwide tribute. The team had also remembered their friend and leader Harry Guin at an Honor Awards ceremony.[60]

Perhaps, many SSC team-member thoughts went to other friends who had fallen along the way and were not present to witness NASA Headquarters's William Trafton, Associate Administrator for the Office of Space Flight, present Roy Estess with a letter designating the SSC as NASA's Lead Center for Rocket Propulsion Testing. The message was almost unbelievable. Patrick "Pat" Scheuermann, tapped by Harry Guin back in 1988 to carry on the bold, "can do" tradition of the SSC team, was not in the auditorium that day with his associates. The 32-year-old engineer, trained by Guin, was manning the new SSC Resident Office in Huntsville! Scheuermann's deep reverence for Guin and respect for Estess were evident when he commented, "I knew we had reached our mark months ago to become NASA's lead center for rocket testing. The lead enter role is a tribute to the vision that Harry and Roy shared for the SSC." Scheuermann also believed that the designation proved the power of the dream that motivated the small, but highly effective, SSC team. After all, the center had risen form a "test support" role in 1986 to its status of responsibility for all NASA rocket testing. This historic document presented by Trafton was clear in its subject and direction and was to take effect on 30 May 1996.[61]

Roy Estess, who had pushed for just such a designation for almost 10 years, responded on behalf of all NASA-SSC personnel when he said, "This is a natural decision for NASA because of the investment that has already been made here in south Mississippi." To Estess and the SSC team, the "lead center" designation was also the fulfillment of another dream of yesteryear. The proud director told his fellow employees, "This major responsibility is also keeping with the vision Dr. Wernher von Braun had in the early 1960s for this installation to be NASA's test center."[62]

Thrilled that NASA had recognized the SSC as its lead center for rocket propulsion testing, Senator Lott praised the NASA designation. "This move

60. "SSC Designated As Lead Testing Center," *Lagniappe*, 20 June 1996, SSCHRC; William C. Trafton to Associate Deputy Administrator (Technical), 28 May 1996, SSCHRC; William C. Trafton to the Director, Stennis Space Center, "Propulsion Testing Lead Center," 30 May 1996, SSCHRC.

61. "SSC Designated..." *Lagniappe;* NASA SSC News Release, Lanee Cobb, "NASA Directs SSC To Manage All Propulsion Test Activities," 7 June 1996, SSCHRC.

62. *Ibid.*

means Stennis will become the Center of Excellence for propulsion testing of rocket engines, not only for NASA but for the Department of Defense, other federal agencies, and private industries with missions involving rocket launches. It means NASA recognized the unique facilities and personnel who have built Stennis's worldwide reputation for high-tech research and development."[63]

A long-time advocate who had supported the SSC as an employee, state senator, and as a U.S. Congressman, Gene Taylor, said, "This is a day we will long remember. Stennis Space Center [was] finally recognized for its unique Space Age facilities, and the best expertise in the world in rocket testing and advanced technology."[64]

Senator Lott's sentiments were also no doubt felt by the uncounted number of employees, their superb leaders, and their community friends, who made uncommon sacrifices in past times to advance the Stennis Space Center to world-class status as America's rocket test center. Indeed, the day was a long time coming for the hundreds of "believers" who participated in the extraordinary, never-give-up campaign waged for years by the little "can do" SSC team. And all the SSC team asked for in return was to finally be granted the respect of their NASA colleagues across the country and to be allowed to use the national rocket test facility to its fullest potential.[65]

The "Way Station to Space" on Mississippi's Pearl River is now engraved on the trade routes of history for future generations to navigate as they explore worlds beyond their wildest dreams.

---

63. Susan Irby and Elizabeth Mavar, Office of Senator Trent Lott, News Release, "NASA Consolidation Rocket Propulsion Testing At Stennis," 5 June 1996, SSCHRC.
64. Office Of U.S. Representative Gene Taylor, News Release, 5 June 1996, SSCHRC.
65. Previous References, *Way Station To Space*, 4 August 1996.

Epilogue

It has been over 33 years since the last residents of Gainesville bundled up their most cherished belongings—a few pieces of antique furniture, some cuttings from their flower beds, and a favorite front-porch rocker—and hauled their worldly goods away from the river bottom that cradled their dying town. The once proud and historic community was left to rest peacefully under a protective canopy of great live oaks along the banks of the Pearl River.

Many of the residents who sold their land to the United States government under the terms of the eminent domain policy could trace their roots back five generations, to the beginning of the historic place. There were a few citizens who were descendants of the French explorers who first sailed up the river in 1699. All of the citizens reluctantly gave up their picturesque homesites to the federal government, so NASA could construct, of all things, a modern complex for the Agency to light-up and test-fire giant rockets bound for the Moon.

Another generation has grown up since that sad day in January 1963. Indeed, the former residents of the Gainesville and Logtown communities were proud when their country did *actually* go to the Moon in July 1969. The spaceship blasted on its journey propelled by Saturn rockets first proven worthy on the giant static-test stands erected on the very grounds cleared by many of their ancestors over 200 years earlier. The former residents, during the years since they left the communities of Gainesville, Logtown, Santa Rosa, Napoleon, and Westonia, witnessed the inspiring Moon missions and followed the daring exploits of the Space Shuttle as the reusable aerospace ship carried on the American spaceflight tradition for over 15 years.

Along with people around the world, they marvelled at the space pictures sent back to Earth by satellites and spacecraft to help farmers, fishermen, firemen, and foresters. The displaced residents, who vacated their homes in 1963, knew that these extraordinarily useful "space maps" were products of the NASA people who came and built laboratories on their vacated Hancock County property. The new "space" people were explorers, too, searching for better ways to make science work for ordinary people. Many of the children and grandchildren of the displaced property owners returned years later to help work modern miracles with computers, to push buttons to static fire

powerful rocket engines, and to study underwater ocean routes for the U.S. Navy's vital oceanographic programs.

By late August 1996, the land once covered by cypress swamps and piney woods had been transformed into a world-class technical hub designated as the lead center to direct and test the nation's present and future rocket propulsion systems. Space Age pioneers of the research laboratories, who learned to use satellite information transmitted from space to advance commercial industries here on Earth, were now recognized internationally for their expertise. These remote sensing experts helped spawn hundreds of new businesses through their commercial programs. The technology they developed during the 1970s and 1980s was now considered the benchmark of the remote sensing industry in this country and abroad.

The space and environmental complex that was begun in 1970 grew through the years paralleling, and in some cases exceeding, the national development of science and technology. By the summer of 1996, there were 22 federal and state agencies located at the installation. These multidisciplinary agencies had been reinventing government for over 25 years, as they advanced their own "space-oceans-Earth" programs. The resident agencies have found that the Jackson Balch axiom of "2 + 2" *can equal* 5 is accurate when the government entities put away their selfish, bureaucratic pursuits and worked together for a common cause. In fact, a new NASA organization was forged in July 1996 that included an Earth Systems Science Office chartered to participate with and share technologies developed by the several agencies located at the Stennis Space Center.

The Navy's oceanographic complex became one of the nation's foremost centers for underwater studies. The highly technical ocean research laboratories at the Stennis Space Center contained one of the largest and most sophisticated computer capabilities anywhere. An upgrading of the Navy's supercomputer capability was announced in May 1996, for a total projected cost of $170.2 million, to be appropriated as needed, with a commitment to keep upgrading during each of the next five years. The new system would elevate the Navy's computer complex to an elite status enjoyed by only a few such cyber-centers in the world. Planning was also done to ensure continued buildup of the computer arrangement into the future.

Even the giant Mississippi Army Ammunition Plant that has been virtually dormant for years, was awakened in early 1997 with announcements (by

Senator Trent Lott and Congressman Gene Taylor) that hundreds of professional and skilled personnel from the Navy would be locating in the huge complex. There were even more promises that hundreds of other employees from other directions would be coming soon to help fill the cavernous empty spaces. With these new proclamations, the words, "full utilization" has once again begun to take on a new future meaning.

The huge successes observed in 1996 were the results of works created, nurtured, and advanced by a succession of committed leaders. Among these leaders were the four directors of the installation: Captain William "Bill" Fortune, Jackson Balch, Jerry Hlass, and Roy Estess. Among NASA Administrators and managers who favorably affected the course of history at the Stennis Space Center were Dr. Wernher von Braun, Dr. James Fletcher, Admiral Richard Truly, Richard "Dick" Wisniewski, and Daniel Goldin. Influential politicians who contributed significantly to the center's success were Senators John C. Stennis, Trent Lott, Thad Cochran, and Allen Ellender. Other members of the Congress who supported the Stennis Space Center were U.S. Representatives William "Bill" Colmer, Gene Taylor, and Robert "Bob" Livingston. This political influence created the environment and opportunity that permitted the space center managers to capitalize on the investment made in the people and facilities in Mississippi. Estess has said, "Without this collective influence, much less could have been achieved."

Without the staunch support of the communities surrounding the center, it would have been difficult for the federal government workers or the politicians to have carried out their assigned tasks and gained new missions, such as the Space Shuttle Main Engine test program, commercial remote sensing enterprises, and lead center responsibility for rocket propulsion testing. Men and women from the local communities came forward in the early years and remained consistent in their positive support of NASA and the other endeavors at the center. Some of these key community leaders included Roy Baxter, Jr., Pearlington; Leo Seal, Jr., Dave McDonald, Ellis Cuevas, Norton Haas, and Dave Truetel, Jr., of Bay St. Louis; George Schloegel of Gulfport; Charlie Nutter, Ted LeMunyon, Dave Sims, and Allen Goff of Picayune; and Irma Cry of Slidell. An association of community friends was cited for its support of the Stennis Space Center in May 1996 when NASA gave its annual Community Service Award to the Partners For Stennis organization, comprised of area leaders from the Mississippi Gulf Coast and St. Tammany Parish, Louisiana.

True, these NASA, political, and community leaders who stood in the "footlights at the center stage" were enormously responsible for the Stennis Space Center's place in American space history. But, as SSC Director Roy Estess observed shortly after taking office, "The important work of NASA is not accomplished in conference rooms or at meetings. The success comes down to the men and women who work quietly back in the shadows, in the shops, and on the test stands." Estess went on to say, "They go out and do their jobs well on a day-to-day basis without fuss or fanfare. It is their hands that lift the Space Shuttle into space."

The people about whom Estess was talking are the members of the well-known Stennis Space Center "can do" team. NASA Administrator Daniel Goldin was astonished at what the small number of about 210 civil servants were able to accomplish in developing rocket propulsion and commercial remote sensing programs. A veteran Stennis Center manager, Doug McLaughlin, put it this way, "We've been able to make do with fewer resources than the other centers for a long time. Cutting corners, working on a shoestring, and finding a 'faster, better, cheaper' way of doing things is nothing new to us."

By the summer of 1996, most of the old NASA territorial and turf disputes and costly competitions for future programs that had kept the Stennis Space Center from operating at its fullest potential in the past had been mitigated by the new breed of engineers and managers in a far less time-consuming and expensive manner than in times past. In fact, there were positive signs that the 1990's generation of engineers and scientists—led by a new wave of Stennis people, including Lon Miller, Mike Dawson, Pat Scheuermann, Richard Gilbrech, David Brannon, Rick Miller, and Gregg Carter—was working across the Agency with counterparts in a cooperative and cohesive team for the benefit of the national taxpayers and the future of America's space program.

Closer to home where this story started in 1961, the people of southwest Mississippi could see the good of their sacrifices in the important civil and national defense programs under way at the Stennis Space Center. The economic and cultural impacts on the areas around the installation have been dramatic. Positive signs of continued growth are evident with NASA and the resident agencies are preparing to enter the next century. Indeed, the promises of peace and prosperity made by Senator Stennis in his speech at Logtown in 1961 have been kept.

Even as this epilogue is closed, NASA and scientists from academia are examining evidence of life on Mars. Rejuvenated members of the NASA team are excitedly daring again to talk of extending their reach to the other planets in our solar system. When they do initiate programs to finish an exploration begun 35 years ago, no doubt the new pioneers will first tarry a while at the Stennis Space Center to test their spaceship engines before setting sail beyond the bounds of Earth on this new ocean of space. And then what of the history of the Stennis Space Center in the new millennium—in the twenty-first century? It is, to be continued...

Acronyms

A&E Architectural and Engineering
A&O Activitation and Operation
ABMA Army Ballistic Missile Agency
AE Applications Engineering Office
AF Air Force
AFB Air Force Base
AFL-CIO American Federation of Labor-Congress of Industrial Organizations
ALS Advanced Launch System
AMC Army Missile Command
ASRM Advanced Solid Rocket Motor

BOMEX Barbados Oceanographic Meteorological Experiment

C&O Construction and Operation
CDT Countdown Demonstration Test
CIN Curb Illegal Narcotics
CM Command Module
CNOC Commander Naval Oceanography Command
COE Center of Excellence
COE Corps of Engineers
COG Complex Operational Group
CRSP Commercial Remote Sensing Program
CSC Computer Sciences Corporation
CTF Component Test Facility

DCAA Defense Contract Audit Agency
DCAS Defense Contract Administrative Services
DOA Department of Army
DOC Department of Commerce
DoD Department of Defense
DTF Diagnostic Test Facility
DOI Department of the Interior

E-1 Formerly: Component Test Facility
E-2 Formerly: High Heat Flux Facility
E&A Engineering and Administration
EAFB Edwards Air Force Base (California)
EAFB Eglin Air Force Base (Florida)
EELV Evolved Expendable Launch Vehicle
ELAS Earth Resources Laboratory Applications Software
EO Equal Opportunity
EOCAP Earth Observations Commercial Applications Program
EOR Earth Orbital Rendezvous
EPA Environmental Protection Agency
ERC Education Resource Center
ERL Earth Resources Laboratory
EROS Earth Resources Observation Systems
ESSA Environmental Science Services Administration

FSR Facility Services Request

GAO General Accounting Office
GE General Electric
GEC Governor's Emergency Council
GSA General Services Administration
GSE Ground Support Equipment

HEDS Human Exploration and Development of Space
HHFF High Heat Flux Facility

ICS Instrument and Control System
ITD Institute for Technology Development

JCWS Johnson Controls World Services
JSC Johnson Space Center

KAFB Keesler Air Force Base
KSC Kennedy Space Center

LM Lunar Module
LOR Lunar Orbit Rendezvous

MAF Michoud Assembly Facility
MSAAP Mississippi Army Ammunition Plant
MPT Main Propulsion Test
MPTA Main Propulsion Test Article
MSC Manned Spacecraft Center (Texas)
MSFC Marshall Space Flight Center
MSU Mississippi State University
MTF Mississippi Test Facility

MTTC Mississippi Technology Transfer Center
MTTO Mississippi Technology Transfer Office
MTO Mississippi Test Operation

NAA North American Aviation
NACA National Advisory Committee for Aeronautics
NASA National Aeronautics and Space Administration
NASA/ SSCPRC National Aeronautics and Space Administration / Stennis Space Center Permanent Records Collection-Director's Files
NASP National Aerospace Plane
NDBC National Data Buoy Center
NFS National Facilities Study
NFLR NASA Federal Laboratory Review
NLS National Launch System
NMFS National Marine Fisheries Service
NOAA National Oceanic and Atmospheric Administration
NOO Naval Oceanographic Office
NORDA Naval Oceanographic Research and Development Activity
NPS National Park Service
NRL Naval Research Laboratories
NRPTA National Rocket Propulsion Test Alliance
NSTL National Space Technology Laboratories

OMSF Office of Manned Space Flight
OPM Office of Personnel Management

PAO Public Affairs Office
PERT Program Evaluation and Review Technique

R&D Research and Development
RAP Regional Applications Program
R&PM Research and Program Management
RIFT Reactor-In-Flight-Test
RLV Reusable Launch Vehicle
RTOP Research and Technology Operating Plan
RTQ Response to Queries

S&ID Space and Information Systems Division (North American Aviation)
SDI Strategic Defense Initiative
SEI Space Exploration Initiative
SRSC Space Remote Sensing Center
SRM Solid Rocket Motor
STS Space Transportation System
SSC John C. Stennis Space Center
SSCHRC Stennis Space Center Historical Records Collection
SSME Space Shuttle Main Engine
S-IC Saturn V First Stage
S-II Saturn V Second Stage
S-IVB Third Stage of Saturn V
S-IB Modified Saturn I Rocket

TEMPO Technical Military Planning Operation
TRC Teacher Resource Center
TTB Technology Test Bed
TWR Technical Work Request

UM University of Mississippi
UNO University of New Orleans
USGS United States Geological Survey
USM University of Southern Mississippi
USSR Union of Soviet Socialist Republics

VC Visitors Center (Building 1200)
VIP Visiting Investigator Program

ZBR Zero Base Review

John C. Stennis Space Center
Chronology of Significant Events

Oct. 25, 1961:	NASA announces decision to establish national rocket test site in Hancock County, Mississippi.
Dec. 18, 1961:	Site officially named Mississippi Test Operations (MTO).
May 17, 1963:	Workmen cut first tree to start clearing the test area for construction.
July 1, 1965:	MTO designated Mississippi Test Facility (MTF).
April 23, 1966:	First Saturn V rocket booster (S-II-T) tested at Mississippi Test Facility.
Sept. 9, 1970:	NASA announces Earth Resources Laboratory will locate at MTF.
March 1, 1971:	Space Shuttle Main Engine (SSME) testing assigned to MTF.
June 14, 1974:	MTF renamed National Space Technology Laboratories (NSTL).
May 19, 1975:	First Space Shuttle Main Engine tested at NSTL.
May 28, 1976:	Flag-raising ceremony marks the official move of the Naval Oceanographic Program to NSTL.
April 21, 1978:	First system test of Space Shuttle Main Propulsion Test Article conducted—including three SSMEs tested simultaneously.
June 11, 1987:	Mississippi Technology Transfer Center dedication held.
Feb. 25, 1988:	NSTL conducts 1,000th test firing of a Space Shuttle Main Engine.
May 9, 1988:	NSTL assigned key role for space remote sensing commercialization.
May 20, 1988:	NSTL renamed John C. Stennis Space Center by Executive order of President Ronald Reagan.
Jan. 18, 1989:	Construction begins on the Component Test Facility to test turbopump machinery for rocket propulsion systems.
Aug. 20, 1990:	First time SSME tests are conducted on all three test stands in one day.
Dec. 30, 1991:	NASA Administrator designates SSC Center of Excellence for large propulsion system testing.
July 24, 1992:	Space Shuttle Main Engine program achieves 2,000th test firing.
Aug. 11, 1993:	High Heat Flux Facility dedicated. The facility tests materials to be used for hypersonic spacecraft of the future.

May 1, 1994: SSME test operations program management transferred from Marshall Space Flight Center to SSC.

May 26, 1995: SSC completes testing on new Block I configuration SSME.

March 16, 1995: First test conducted on a sub-scale cryogenic fuel tank for the X-33 Reusable Launch Vehicle (RLV) program.

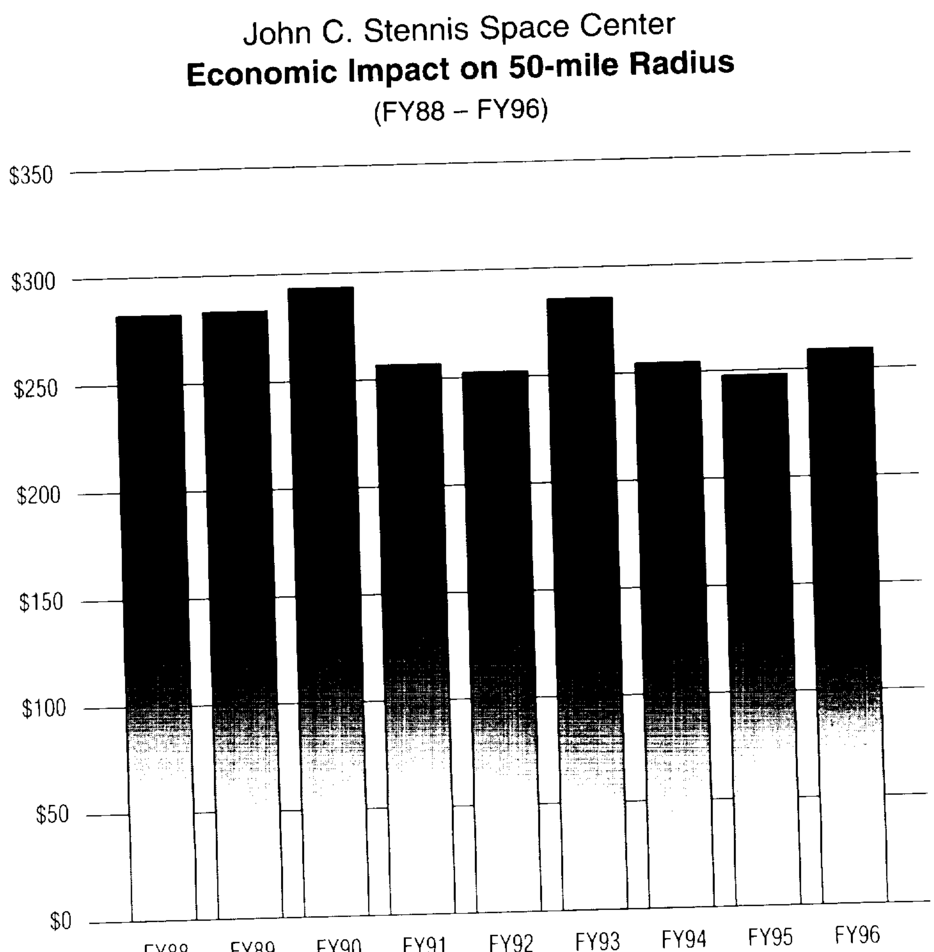
May 19, 1996: *Endeavour* is the first Space Shuttle to fly three Block I SSMEs, all tested at SSC.

May 30, 1996: NASA designates SSC as lead center to manage capabilities and assets for rocket propulsion testing.

July 2, 1996: NASA Headquarters announces SSC will conduct and manage engine component testing for the X-33 for the RLV program.

Nov. 24, 1996: SSC designated as NASA's lead center for implementing commercial remote sensing activities.

Charts and Graphs

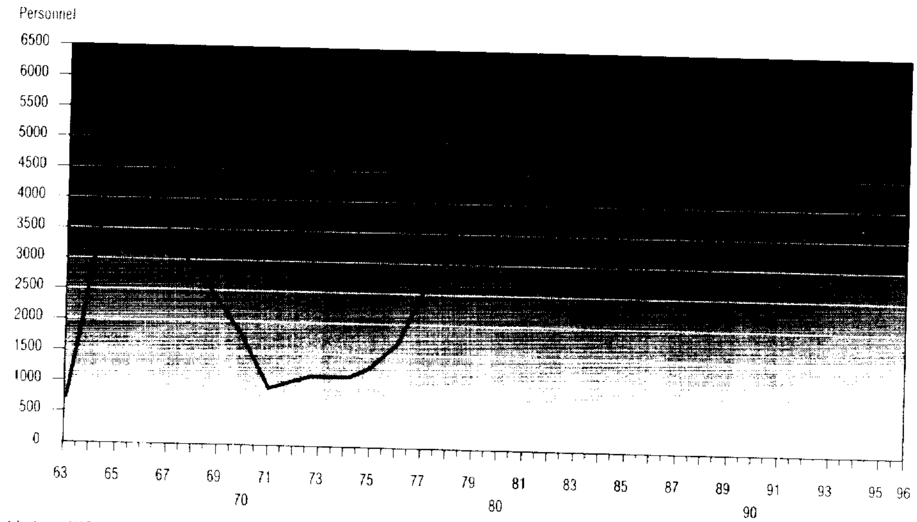


Total	$282M	$283M	$293M	$257M	$252M	$286M	$254M	$248M	$259M

John C. Stennis Space Center

Population Trend*

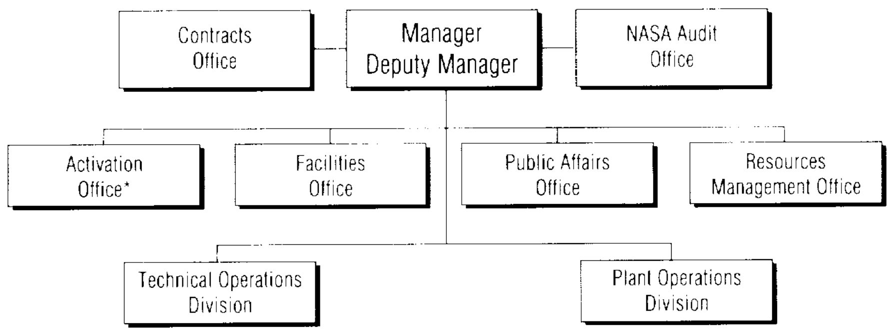
(1963 – 1996)



* Includes NASA, contractor and resident agency personnel

Mississippi Test Operations

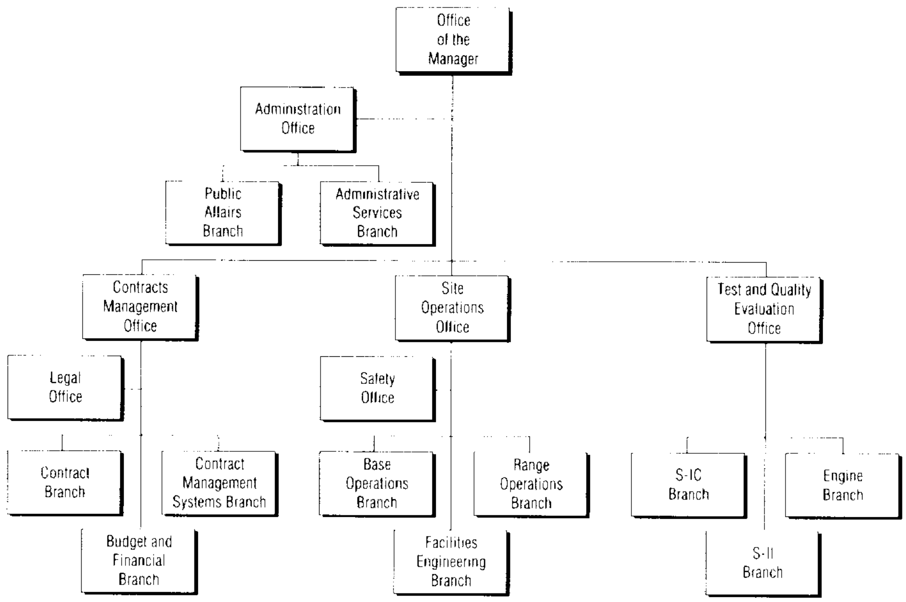
1963



* Marshall Space Flight Center (Huntsville, AL)

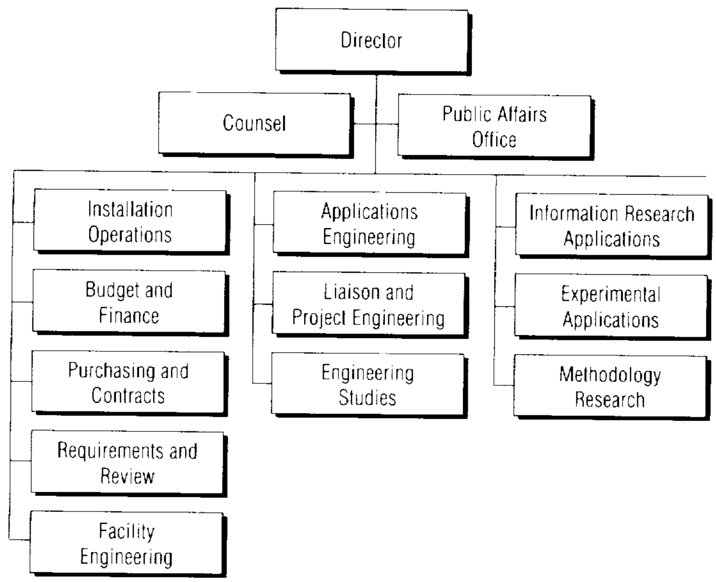
Mississippi Test Facility Organization

1967



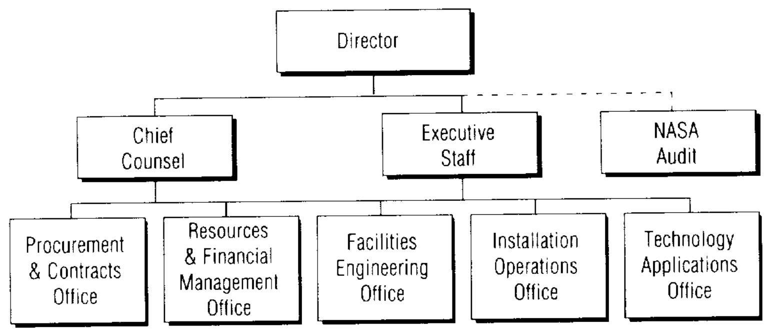
Mississippi Test Facility

1972



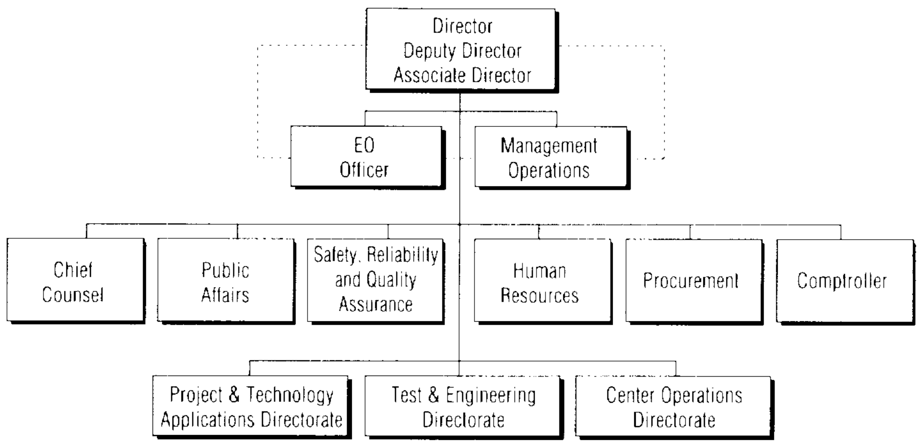
National Space Technology Laboratories

1976



John C. Stennis Space Center

1993



Index

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X-Y-Z

About the Author

Mack Herring, a 35-year veteran of NASA, has had the opportunity to be an eyewitness to the first decades of the history of human exploration of space, especially from the viewpoint of how the John C. Stennis Space Center contributed and related to the momentous events since it was conceived in 1961. Herring's book, *Way Station to Space, A History of the John C. Stennis Space Center*, tells the history of the facility with the drama that comes best from a seasoned journalist, and the documented accuracy of a historian.

Herring graduated from the University of Alabama where he majored in journalism, English, and creative writing. He began his writing career in college, covering the controversy surrounding the issue of school integration events occurring at the university for *Look* magazine and the *Birmingham Post-Herald*. Upon graduation, Herring became editor of the *Geneva (AL) Reaper* and later worked as a reporter and feature writer for the *Dothan (AL) Eagle*.

After serving one year as public information officer for the U.S. Army Aviation Center at Fort Rucker, AL, Herring joined the Public Affairs Office at the NASA George C. Marshall Space Flight Center in Huntsville, AL. He wrote numerous newspaper and magazine features about the early work of the Marshall Center that were published in *Aviation Week*, *Missiles and Rockets*, and in newspapers in this country and abroad. He collaborated with the late Dr. Wernher von Braun to write several pieces, including an article expressing von Braun's views regarding his expectations for the world in the year 2000 that appeared in *Reader's Digest*. Another feature Herring wrote with von Braun, *Building A Colony On The Moon*, an often-used reference today, appeared in a national publication.

The author's association with the Stennis Space Center (SSC) dates back to its very first day of existence when he wrote the press release 25 October 1961 announcing the construction of the national rocket testing facility. He served as its first public affairs officer and saw first hand the exodus of the original landowners, testing of the giant Saturn V, and the development of the center as a unique, multiagency federal laboratory.

Herring gained a national and international perspective of NASA while serving as an astronaut protocol officer at NASA Headquarters, and as an

information officer aboard the astronaut recovery ships during the Mercury, Gemini, and Apollo programs. As a speech writer, Herring contributed to speeches given by Presidents John Kennedy and Richard Nixon, as well as numerous space program notables.

Most recently, he authored a short biography of Senator John C. Stennis entitled "Father of America's Modern Navy," for a brochure distributed at the commissioning of the aircraft carrier named in the Senator's honor. The sketch has also been widely distributed by the U.S. Navy.

For the past 20 years, Herring has written a monthly column for the SCC's *Lagniappe* newspaper. Interestingly, he was instrumental in founding the newspaper at the facility. He was the SSC's first historian and serves today as an advisor on historical matters to the center director and public affairs officer.

Herring lives in Bay St. Louis, MS, and has two children, Steven Lee, who resides at Point Richmond, CA, and Kyle Jackson of Seabrook, TX.

The NASA History Series

Reference Works, NASA SP-4000:

Grimwood, James M. *Project Mercury: A Chronology.* (NASA SP-4001, 1963).

Grimwood, James M., and Hacker, Barton C., with Vorzimmer, Peter J. *Project Gemini Technology and Operations: A Chronology.* (NASA SP-4002, 1969).

Link, Mae Mills. *Space Medicine in Project Mercury.* (NASA SP-4003, 1965).

Astronautics and Aeronautics, 1963: Chronology of Science, Technology, and Policy. (NASA SP-4004, 1964).

Astronautics and Aeronautics, 1964: Chronology of Science, Technology, and Policy. (NASA SP-4005, 1965).

Astronautics and Aeronautics, 1965: Chronology of Science, Technology, and Policy. (NASA SP-4006, 1966).

Astronautics and Aeronautics, 1966: Chronology of Science, Technology, and Policy. (NASA SP-4007, 1967).

Astronautics and Aeronautics, 1967: Chronology of Science, Technology, and Policy. (NASA SP-4008, 1968).

Ertel, Ivan D., and Morse, Mary Louise. *The Apollo Spacecraft: A Chronology, Volume I, Through November 7, 1962.* (NASA SP-4009, 1969).

Morse, Mary Louise, and Bays, Jean Kernahan. *The Apollo Spacecraft: A Chronology, Volume II, November 8, 1962–September 30, 1964.* (NASA SP-4009, 1973).

Brooks, Courtney G., and Ertel, Ivan D. *The Apollo Spacecraft: A Chronology, Volume III, October 1, 1964–January 20, 1966.* (NASA SP-4009, 1973).

Ertel, Ivan D., and Newkirk, Roland W., with Brooks, Courtney G. *The Apollo Spacecraft: A Chronology, Volume IV, January 21, 1966–July 13, 1974.* (NASA SP-4009, 1978).

Astronautics and Aeronautics, 1968: Chronology of Science, Technology, and Policy. (NASA SP-4010, 1969).

Newkirk, Roland W., and Ertel, Ivan D., with Brooks, Courtney G. *Skylab: A Chronology.* (NASA SP-4011, 1977).

Van Nimmen, Jane, and Bruno, Leonard C., with Rosholt, Robert L. *NASA Historical Data Book, Volume I: NASA Resources, 1958–1968.* (NASA SP-4012, 1976, rep. ed. 1988).

Ezell, Linda Neuman. *NASA Historical Data Book, Volume II: Programs and Projects, 1958–1968.* (NASA SP-4012, 1988).

Ezell, Linda Neuman. *NASA Historical Data Book, Volume III: Programs and Projects, 1969–1978.* (NASA SP-4012, 1988).

Astronautics and Aeronautics, 1969: Chronology of Science, Technology, and Policy. (NASA SP-4014, 1970).

Astronautics and Aeronautics, 1970: Chronology of Science, Technology, and Policy. (NASA SP-4015, 1972).

Astronautics and Aeronautics, 1971: Chronology of Science, Technology, and Policy. (NASA SP-4016, 1972).

Astronautics and Aeronautics, 1972: Chronology of Science, Technology, and Policy. (NASA SP-4017, 1974).

Astronautics and Aeronautics, 1973: Chronology of Science, Technology, and Policy. (NASA SP-4018, 1975).

Astronautics and Aeronautics, 1974: Chronology of Science, Technology, and Policy. (NASA SP-4019, 1977).

Astronautics and Aeronautics, 1975: Chronology of Science, Technology, and Policy. (NASA SP-4020, 1979).

Astronautics and Aeronautics, 1976: Chronology of Science, Technology, and Policy. (NASA SP-4021, 1984).

Astronautics and Aeronautics, 1977: Chronology of Science, Technology, and Policy. (NASA SP-4022, 1986).

Astronautics and Aeronautics, 1978: Chronology of Science, Technology, and Policy. (NASA SP-4023, 1986).

Astronautics and Aeronautics, 1979-1984: Chronology of Science, Technology, and Policy. (NASA SP-4024, 1988).

Astronautics and Aeronautics, 1985: Chronology of Science, Technology, and Policy. (NASA SP-4025, 1990).

Gawdiak, Ihor Y. Compiler. *NASA Historical Data Book, Volume IV: NASA Resources, 1969–1978.* (NASA SP-4012, 1994).

Noordung, Hermann. *The Problem of Space Travel: The Rocket Motor.* Ernst Stuhlinger, and J.D. Hunley, with Jennifer Garland. Editors. (NASA SP-4026, 1995).

Astronautics and Aeronautics, 1986–1990: Chronology of Science, Technology, and Policy. (NASA SP-4027, 1997).

Management Histories, NASA SP-4100:

Rosholt, Robert L. *An Administrative History of NASA, 1958–1963.* (NASA SP-4101, 1966).

Levine, Arnold S. *Managing NASA in the Apollo Era.* (NASA SP-4102, 1982).

Roland, Alex. *Model Research: The National Advisory Committee for Aeronautics, 1915–1958.* (NASA SP-4103, 1985).

Fries, Sylvia D. *NASA Engineers and the Age of Apollo* (NASA SP-4104, 1992).

Glennan, T. Keith. *The Birth of NASA: The Diary of T. Keith Glennan*, edited by J.D. Hunley. (NASA SP-4105, 1993).

Seamans, Robert C., Jr. *Aiming at Targets: The Autobiography of Robert C. Seamans, Jr.* (NASA SP-4106, 1996).

Project Histories, NASA SP-4200:

Swenson, Loyd S., Jr., Grimwood, James M., and Alexander, Charles C. *This New Ocean: A History of Project Mercury.* (NASA SP-4201, 1966).

Green, Constance McL., and Lomask, Milton. *Vanguard: A History.* (NASA SP-4202, 1970; rep. ed. Smithsonian Institution Press, 1971).

Hacker, Barton C., and Grimwood, James M. *On Shoulders of Titans: A History of Project Gemini.* (NASA SP-4203, 1977).

Benson, Charles D. and Faherty, William Barnaby. *Moonport: A History of Apollo Launch Facilities and Operations.* (NASA SP-4204, 1978).

Brooks, Courtney G., Grimwood, James M., and Swenson, Loyd S., Jr. *Chariots for Apollo: A History of Manned Lunar Spacecraft.* (NASA SP-4205, 1979).

Bilstein, Roger E. *Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles.* (NASA SP-4206, 1980; paperback reprint 1996).

Compton, W. David, and Benson, Charles D. *Living and Working in Space: A History of Skylab.* (NASA SP-4208, 1983).

Ezell, Edward Clinton, and Ezell, Linda Neuman. *The Partnership: A History of the Apollo-Soyuz Test Project.* (NASA SP-4209, 1978).

Hall, R. Cargill. *Lunar Impact: A History of Project Ranger.* (NASA SP-4210, 1977).

Newell, Homer E. *Beyond the Atmosphere: Early Years of Space Science.* (NASA SP-4211, 1980).

Ezell, Edward Clinton, and Ezell, Linda Neuman. *On Mars: Exploration of the Red Planet, 1958–1978.* (NASA SP-4212, 1984).

Pitts, John A. *The Human Factor: Biomedicine in the Manned Space Program to 1980.* (NASA SP-4213, 1985).

Compton, W. David. *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions.* (NASA SP-4214, 1989).

Naugle, John E. *First Among Equals: The Selection of NASA Space Science Experiments* (NASA SP-4215, 1991).

Wallace, Lane E. *Airborne Trailblazer: Two Decades with NASA Langley's Boeing 737 Flying Laboratory.* (NASA SP-4216, 1994).

Butrica, Andrew J. Editor. *Beyond the Ionosphere: Fifty Years of Satellite Communication.* (NASA SP-4217, 1997).

Butrica, Andrews J. *To See the Unseen: A History of Planetary Radar Astronomy.* (NASA SP-4218, 1996).

Center Histories, NASA SP-4300:

Rosenthal, Alfred. *Venture into Space: Early Years of Goddard Space Flight Center.* (NASA SP-4301, 1985).

Hartman, Edwin, P. *Adventures in Research: A History of Ames Research Center. 1940–1965.* (NASA SP-4302, 1970).

Hallion, Richard P. *On the Frontier: Flight Research at Dryden, 1946–1981.* (NASA SP-4303, 1984).

Muenger, Elizabeth A. *Searching the Horizon: A History of Ames Research Center. 1940–1976.* (NASA SP-4304, 1985).

Hansen, James R. *Engineer in Charge: A History of the Langley Aeronautical Laboratory, 1917–1958.* (NASA SP-4305, 1987).

Dawson, Virginia P. *Engines and Innovation: Lewis Laboratory and American Propulsion Technology.* (NASA SP-4306, 1991).

Dethloff, Henry C. *"Suddenly Tomorrow Came...": A History of the Johnson Space Center, 1957–1990.* (NASA SP-4307, 1993).

Hansen, James R. *Spaceflight Revolution: NASA Langley Research Center from Sputnik to Apollo* (NASA SP-4308, 1995).

Wallace, Lane E. *Flights of Discovery: An Illustrated History of the Dryden Flight Research Center.* (NASA SP-4309, 1996).

Herring, Mark R. *Way Station to Space: A History of the John C. Stennis Space Center.* (NASA SP-4310, 1997).

General Histories, NASA SP-4400:

Corliss, William R. *NASA Sounding Rockets, 1958–1968: A Historical Summary.* (NASA SP-4401, 1971).

Wells, Helen T., Whiteley, Susan H., and Karegeannes, Carrie. *Origins of NASA Names.* (NASA SP-4402, 1976).

Anderson, Frank W., Jr., *Orders of Magnitude: A History of NACA and NASA, 1915–1980.* (NASA SP-4403, 1981).

Sloop, John L. *Liquid Hydrogen as a Propulsion Fuel, 1945–1959.* (NASA SP-4404, 1978).

Roland, Alex. Editor. *A Spacefaring People: Perspectives on Early Spaceflight.* (NASA SP-4405, 1985).

Bilstein, Roger E. *Orders of Magnitude: A History of the NACA and NASA, 1915–1990.* (NASA SP-4406, 1989).

Logsdon, John M. General Editor. With Lear, Linda J., Warren-Findley, Jannelle, Williamson, Ray A., and Day, Dwayne A. *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume I: Organizing for Exploration.* (NASA SP-4407, 1995).

Logsdon, John M. General Editor. With Day, Dwayne A., and Launius, Roger D. *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume II: External Relationships.* (NASA SP-4407, 1996).